

Portarlinton JLAP Strategic Flood Risk Assessment

Live Report

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Contract

This report describes work commissioned by Laois County Council, by a letter dated March 2024. Ross Bryant and Justin Nangle of JBA Consulting carried out this work.

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Abbreviations

AEP	Annual Exceedance Probability
AFA	Area for Further Assessment
CCC	Clare County Council
CFRAM	Catchment Flood Risk Assessment and Management
DTM	Digital Terrain Model
EPA	Environmental Protection Agency
FEH	Flood Estimation Handbook
FFL	Finished Floor Level
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
FRR	Flood Risk Review
FSU	Flood Studies Update
GIS	Geographical Information System
HEFS	High End Future Scenario
HPW	High Priority Watercourse
JT	Justification Test
LA	Local Authority
LAP	Local Area Plan
LCDP	Limerick Development Plan
MPW	Medium Priority Watercourse
MRFS	Medium Range Future Scenario
OPW	Office of Public Works
OSi	Ordnance Survey Ireland
PFRA	Preliminary Flood Risk Assessment
RSES	Regional Spatial and Economic Strategy
RBD	River Basin District
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems

1 Introduction

JBA Consulting was appointed by Laois and Offaly County Councils to carry out the Strategic Flood Risk Assessment for the Portarlington Joint Local Area Plan 2025-2031.

This report details the SFRA for this area and has been prepared in accordance with the requirements of the DoEHLG and OPW Planning Guidelines, The Planning System and Flood Risk Management¹; these guidelines were issued under the Planning and Development Act 2000 and recognise the significance of proper planning to manage flood risk.

1.1 Terms of Reference

Under the "Planning System and Flood Risk Management" guidelines, the purpose for the FRA is detailed as being *"to provide a broad (wide area) assessment of all types of flood risk to inform strategic land-use planning decisions. SFRAs enable the LA to undertake the sequential approach, including the Justification Test, allocate appropriate sites for development and identify how flood risk can be reduced as part of the development plan process"*.

The Portarlington Joint Local Area Plan 2025-2031 (LAP) will be the key document for setting out a vision for the development of Portarlington during the plan period.

It is important that the LAP fulfils the requirements of the document "The Planning System and Flood Risk Management Guidelines for Planning Authorities" (OPW/DoEHLG, 2009) which states that flood risk management should be integrated into spatial planning policies at all levels to enhance certainty and clarity in the overall planning process.

In order to ensure that flood risk is integrated into the LAP, the main requirements of the SFRA are to:

- Prepare a Stage 2 - Flood Risk Assessment of Portarlington in particular in relation to location and type of zoning and land-use proposals, with a focus on new or changed zoning compared with the current plan.
- Review and update the policy guidance within the SFRA in compliance with OPW/DoEHLG – "The Planning System and Flood Risk Management –Guidelines for Planning Authorities (OPW/DoEHLG, 2009)".
- Advise on zonings/land use-proposals and appropriate mitigation measures, assess and report on any submissions received as part of both the preparation and the public consultation stage of the plan, as they relate to flood risk.

1.2 Report Structure

This study considers the development strategy that will form part of the Joint Local Area Plan for Portarlington. The context of flood risk in Portarlington is considered with specific reference to a range of flood sources, including fluvial, pluvial and groundwater.

A two-stage assessment of flood risk was undertaken, as recommended in 'The Planning System and Flood Risk Management' guidelines, for the area that lies within the development boundary of the Development Plan. The first stage is to review historical flooding and flood extents and make updates based on new datasets and updated land use zoning.

Historical records and recent events demonstrate that Portarlington has a history of flooding and confirms that a proportion of zoned lands are at flood risk. The SFRA must

¹ DoEHLG and OPW (2009) The Planning System and Flood Risk Management: Guidelines for Planning Authorities

protect lands for any potential future flood risk management infrastructure and ensure that development within Flood Zones A/B is sustainably managed.

The second stage and the main purpose of this SFRA report is to appraise the adequacy of existing information, to prepare a Flood Zone map, based on available data, and to highlight potential development areas that require application of the Justification Test and/or more detailed assessment on a site specific level. The SFRA also provides guidelines for development within areas at potential risk of flooding, and specifically looks at flood risk and the potential for development within a number of key sites in Portarlinton.

Section 2 of this report provides an introduction to the study area and Section 3 discusses the concepts of flooding, Flood Zones and flood risk as they are incorporated into the Planning System and Flood Risk Management.

In Section 4 the available data related to flooding is summarised and appraised and outlines the sources of flooding to be considered, based on the review of available data. This section also considers the flood management assets that are in place. Section 4.5 summarises the key sources of flooding.

Following this, Section 5 outlines the flood risk management policy and Section 6 provides guidance and suggested approaches to managing flood risk to development; the contents of this section will be of particular use in informing the policies and objectives within the Development Plan.

Section 7 contains the review of land use zoning objectives across the settlement it also summarises the application of the Justification Test to which specific responses are included in the Appendix.

2 Portarlington Study Area

2.1 Introduction

The plan area comprises the full extent of Portarlington and is located on the crossroads of R419 from Rathangan towards Portlaoise and the R420 from Tullamore ending at the intersection with the R445 close to Monasterevin. Portarlington is situated in the Barrow_SC_020 and Barrow_SC_030 sub catchments which are within the Barrow catchment. The River Barrow including the Blackstick Drain flow through the village with the Barrow flowing from the south west to an easterly direction where it confluences with the River Figile close to Monasterevin. Lands within the LAP contain a mix of agricultural, residential, and commercial lands².

2.2 Watercourses

The primary watercourse in the Portarlington area is the River Barrow which drains an area of approximately 3025km². The principal river in the Barrow River Basin is the River Barrow which rises in the Slieve Bloom Mountains in County Laois near the town of Mountmellick. The Barrow flows first in an easterly and then a southerly direction through the towns of Portarlington, Athy, Carlow and Bagenalstown before discharging to the Barrow Estuary at New Ross. It is joined by the Nore River approximately four kilometres upstream of New Ross and is tidal for about another 13 kilometres upstream to St. Mullins. The topography of the Barrow River Basin reveals a general southerly drainage pattern of the area towards the discharge of the River Barrow to the Waterford Estuary which is the confluence of the Three Sisters (the Barrow, Nore and Suir Rivers). Small areas of high ground are present on the eastern and western borders of the River Basin³.

Portarlington is affected by fluvial flooding. As the River Barrow passes through Portarlington town, out of bank flooding occurs due to insufficient channel capacity. Receptors are also at risk at the downstream extent of the Blackstick Drain due to a back water effect from the River Barrow.

There are a significant number of residential and business properties affected within the settlement. Also situated within the floodplain are many social amenity sites, several roads including two regional roads and cultural heritage assets.

Portarlington flood risk will include other sources, such as pluvial and surface water runoff will have influenced these previous levels experienced. Key locations at risk of flooding are in Patrick Street, Barlows Lane, Abhann Dubh, Foxcroft Avenue, Spa Street, People's Park, Botley Lane, Bog Road, Bracklone Industrial Estate. The study area and the watercourses are shown in Figure 2-1 over page.

² CAAS (2021) *Strategic Flood Risk Assessment for the Offaly County Development Plan 2021-2027*. Available at: [Microsoft Word - Offaly CDP 2021-2027 SFRA](#) [Accessed 07 May 2024].

³ The Office of Public Works (2018) *Flood Risk Management plan Barrow* p.6. Available at: [FRMP_Final2018_RiverBasin_14.pdf](#) [Accessed 07 May 2024].

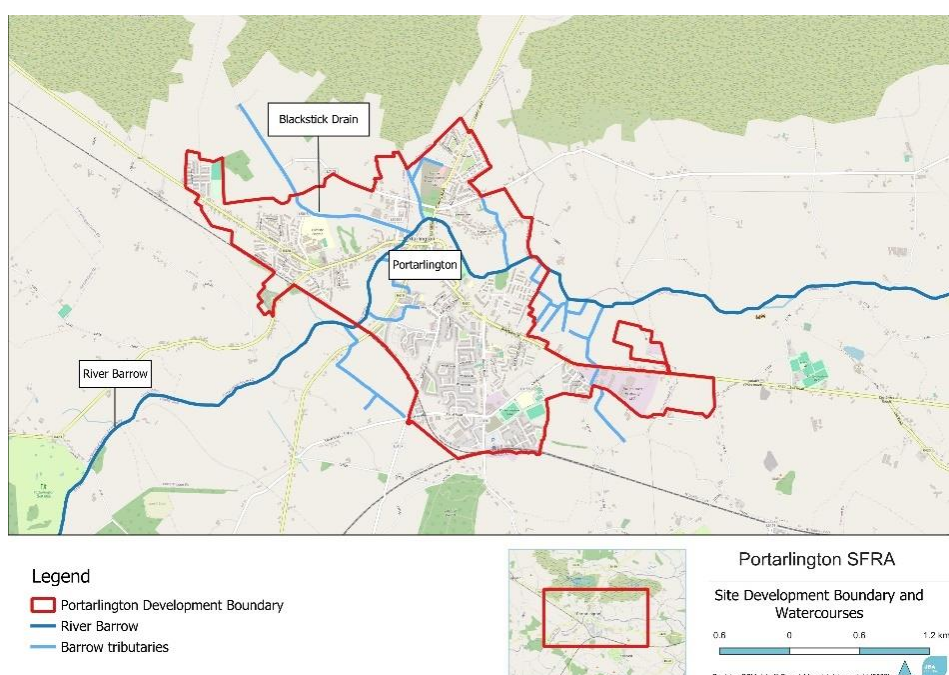


Figure 2-1: Study Area and Watercourses

2.3 Current Planning Policy

2.3.1 Eastern and Midland Regional Assembly Regional Spatial & Economic Strategy

The Regional Spatial & Economic Strategy (RSES) for the Southern Region includes a significant focus on sustainability and flood management, encapsulated in Water Resource and Flooding National Policy Objective (NPO) 57, which "seeks to enhance water quality and resource management by:

Ensuring flood risk management informs placemaking by avoiding inappropriate development in areas at risk of flooding in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities".

This policy objective is underpinned by a range of objectives which include implementation of the Flood's Directive and the Planning System and Flood Risk Management as well supporting capital investment in flood relief schemes and measures for managing flooding and coastal erosion.

The RSES is supported by a Regional Flood Risk Appraisal Report, which generally promotes the CFRAM programme and thereby the recommended flood relief schemes in the region.

2.3.2 Laois & Offaly County Development Plans 2021-2027

Portarlinton falls within the planning context of both the Laois County Development Plan (LCDP) and the Offaly County Development Plan.

The Laois & Offaly County Development Plans 2021-2027 set out the strategy for development in accordance with the Core Strategy.

The Core Strategy, population and housing supply targets are in compliance with the designated populations and housing for the County as set out in the National Planning Framework Roadmap and in accordance with the Housing Supply Target Methodology for Development Planning Guidelines for Planning Authorities. All of the settlements identified are established settlements of various sizes, from the Key Towns to

designated clusters including the self-sustaining growth town of Portarlington. The Development Plans state that The Planning System and Flood Risk Management (and Technical Appendices) Guidelines for Planning Authorities (DoEHLG, OPW, 2009) will need to be applied at a more strategic level to reflect the more strategic nature of the Laois & Offaly County Development Plans.

A number of Flood Risk Management policies have been included in the development plans. This covers:

- Strategic flood risk assessment
- Catchment Flood Risk Assessment and Management Studies
- Storm water management
- Green infrastructure and flood management
- Maintenance of rivers
- Nature based solutions

2.4 Local Area Plans

2.4.1 Portarlington Joint Local Area Plan 2025-2031 (as amended)

The Laois County Development Plan 2017-2023 and the Offaly County Development Plan 2014- 2020 were the 'parent' documents which underpinned the Laois County Council and Offaly County Council Portarlington Joint Local Area Plan 2018-2024. As such, objectives and policies contained in the CDP informed the preparation and operation of the JLAP. The 2021-2027 Laois and Offaly CDP's are now the parent documents for the JLAP 2025 - 2031.

Portarlington has been subject to a number of flood risk assessments, both through the County Development Plan 2022-2028 SFRA, the South East CFRAM and most recently, the Portarlington Flood Relief Scheme study.

3 The Planning System and Flood Risk Management

3.1 Introduction

Prior to discussing the management of flood risk, it is helpful to understand what is meant by the term. It is also important to define the components of flood risk in order to apply the principles of the Planning System and Flood Risk Management in a consistent manner.

The Planning System and Flood Risk Management: Guidelines for Planning Authorities, published in November 2009, describe flooding as a natural process that can occur at any time and in a wide variety of locations. Flooding can often be beneficial, and many habitats rely on periodic inundation. However, when flooding interacts with human development, it can threaten people, their property and the environment.

This Section will firstly outline the definitions of flood risk and the Flood Zones used as a planning tool; a discussion of the principles of the planning guidelines and the management of flood risk in the planning system will follow.

3.2 Definition of Flood Risk

Flood risk is generally accepted to be a combination of the likelihood (or probability) of flooding and the potential consequences arising. Flood risk can be expressed in terms of the following relationship:

Flood Risk = Probability of Flooding x Consequences of Flooding

The assessment of flood risk requires an understanding of the sources, the flow path of floodwater and the people and property that can be affected. The source - pathway - receptor model, shown below in Figure 3-1, illustrates this and is a widely used environmental model to assess and inform the management of risk.

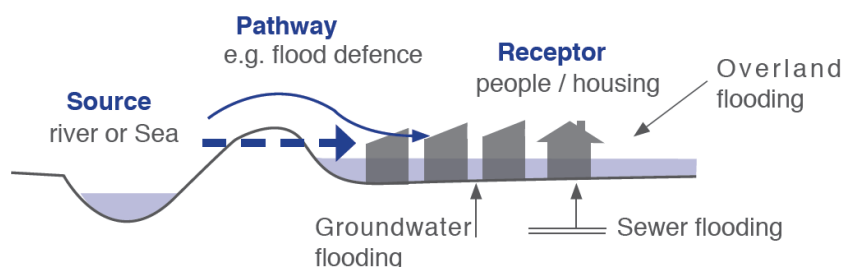


Figure 3-1: Source Pathway Receptor Model

Source: Figure A1 The Planning System and Flood Risk Management Guidelines Technical Appendices

Principal sources of flooding are rainfall or higher than normal sea levels while the most common pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets. Receptors can include people, their property and the environment. All three elements must be present for flood risk to arise. Mitigation measures, such as defences or flood resilient construction, have little or no effect on sources of flooding but they can block or impede pathways or remove receptors.

The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk.

3.3 Likelihood of Flooding

Likelihood or probability of flooding of a particular flood event is classified by its annual exceedance probability (AEP) or return period (in years). A 1% AEP flood indicates the flood event that will occur or be exceeded on average once every 100 years and has a 1 in 100 chance of occurring in any given year.

Return period is often misunderstood to be the period between large flood events rather than an average recurrence interval. Annual exceedance probability is the inverse of return period as shown in Figure 3-1.

Table 3-1: Probability of Flooding

Return Period (Years)	Annual Exceedance Probability (%)
2	50
100	1
200	0.5
1000	0.1

Considered over the lifetime of development, an apparently low-frequency or rare flood has a significant probability of occurring. For example:

- A 1% flood has a 22% (1 in 5) chance of occurring at least once in a 25-year period - the period of a typical residential mortgage;
- And a 53% (1 in 2) chance of occurring in a 75-year period - a typical human lifetime.

3.4 Consequences of Flooding

Consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, wave-action effects, water quality) and the vulnerability of receptors (type of development, nature, e.g. age-structure, of the population, presence and reliability of mitigation measures etc).

The Planning System and Flood Risk Management guidelines provide three vulnerability categories, based on the type of development, which are detailed in Table 3.1 of the Guidelines, and are summarised as:

- **Highly vulnerable**, including residential properties, essential infrastructure and emergency service facilities;
- **Less vulnerable**, such as retail and commercial and local transport infrastructure;
- **Water compatible**, including open space, outdoor recreation and associated essential infrastructure, such as changing rooms.

3.5 Definition of Flood Zones

In the Planning System and Flood Risk Management guidelines, Flood Zones are used to indicate the likelihood of a flood occurring. These Zones indicate a high, moderate or low probability of flooding from fluvial or tidal sources and are defined below in Table 3-2.

It is important to note that the definition of the Flood Zones is based on an undefended scenario and does not take into account the presence of flood protection structures such as flood walls or embankments. This is to allow for the fact that there is a residual risk of flooding behind the defences due to

overtopping or breach and that there may be no guarantee that the defences will be maintained in perpetuity.

It is also important to note that the Flood Zones indicate flooding from fluvial and tidal sources and do not take other sources, such as groundwater or pluvial, into account, so an assessment of risk arising from such sources should also be made.

Table 3-2: Definition of Flood Zones

Zone	Description
Zone A High probability of flooding.	This zone defines areas with the highest risk of flooding from rivers (i.e. more than 1% probability or more than 1 in 100) and the coast (i.e. more than 0.5% probability or more than 1 in 200).
Zone B Moderate probability of flooding.	This zone defines areas with a moderate risk of flooding from rivers (i.e. 0.1% to 1% probability or between 1 in 100 and 1 in 1000) and the coast (i.e. 0.1% to 0.5% probability or between 1 in 200 and 1 in 1000).
Zone C Low probability of flooding.	This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1000).

3.6 Objectives and Principles of the Planning Guidelines

The Planning System and Flood Risk Management Guidelines describe good flood risk practice in planning and development management. Planning authorities are directed to have regard to the guidelines in the preparation of Development Plans and Local Area Plans, and for development control purposes.

The objective of the Planning System and Flood Risk Management Guidelines is to integrate flood risk management into the planning process, thereby assisting in the delivery of sustainable development. For this to be achieved, flood risk must be assessed as early as possible in the planning process. Paragraph 1.6 of the Guidelines states that the core objectives are to:

- "Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management".

The guidelines aim to facilitate 'the transparent consideration of flood risk at all levels of the planning process, ensuring a consistency of approach throughout the country.' SFRAs therefore become a key evidence base in meeting these objectives.

The 'Planning System and Flood Risk Management' works on a number of key principles, including:

- Adopting a staged and hierarchical approach to the assessment of flood risk;
- Adopting a sequential approach to the management of flood risk, based on the frequency of flooding (identified through Flood Zones) and the vulnerability of the proposed land use.

3.7 The Sequential Approach & Justification Test

Each stage of the Flood Risk Assessment (FRA) process aims to adopt a sequential approach to management of flood risk in the planning process.

Where possible, development in areas identified as being at flood risk should be avoided; this may necessitate de-zoning lands within the development plan. If de-zoning is not possible, then rezoning from a higher vulnerability land use, such as residential, to a less vulnerable use, such as open space may be required.

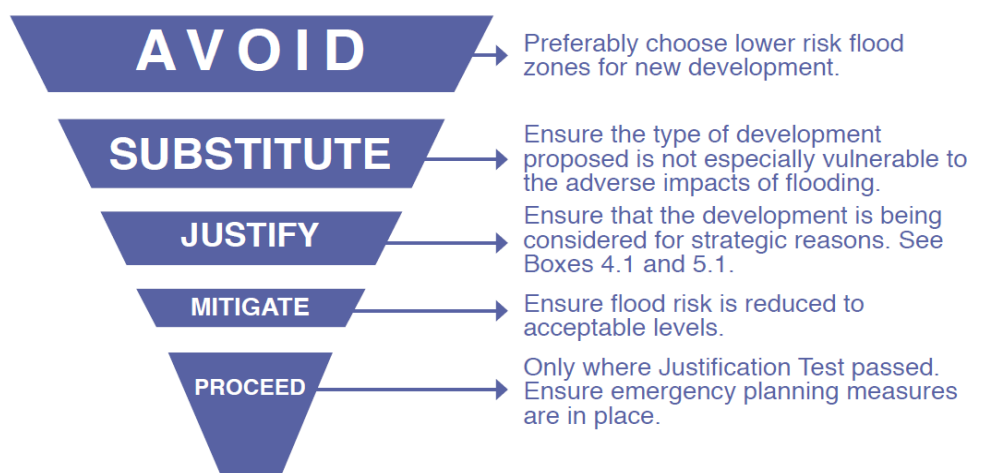


Figure 3-2: Sequential Approach in Flood Risk Management

Source: The Planning System and Flood Risk Management (Figure 3.1)

Where rezoning is not possible, exceptions to the development restrictions are provided for through the application of the Justification Test. Many towns have central areas that are affected by flood risk and have been targeted for growth. To allow the sustainable and compact development of these urban centres, development in areas of flood risk may be considered necessary. For development in such areas to be allowed, the Justification Test must be passed.

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of such developments. The test is comprised of two processes; the Plan-making Justification Test, and the Development Management Justification Test. The latter is used at the planning application stage where it is intended to develop land that is at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be considered inappropriate for that land.

Table 3-3 shows which types of development, based on vulnerability to flood risk, are appropriate land uses for each of the Flood Zones. The aim of the SFRA is to guide development zonings to those which are 'appropriate' and thereby avoid the need to apply the Justification Test.

Table 3-3: Matrix of Vulnerability

	Flood Zone A High Probability	Flood Zone B Moderate Probability	Flood Zone C Low Probability
Highly Vulnerable Development (Including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less Vulnerable Development	Justification Test	Appropriate	Appropriate
Water-Compatible Development	Appropriate	Appropriate	Appropriate

3.8 Scales and Stages of Flood Risk Assessment

Within the hierarchy of regional, strategic and site-specific flood-risk assessments, a tiered approach ensures that the level of information is appropriate to the scale and nature of the flood-risk issues and the location and type of development proposed, avoiding expensive flood modelling and development of mitigation measures where it is not necessary. The stages and scales of flood risk assessment comprise of:

- **Regional Flood Risk Assessment (RFRA)** – a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment and to identify where flood risk management measures may be required at a regional level to support the proposed growth. This should be based on readily derivable information and undertaken to inform the Regional Planning Guidelines.
- **Strategic Flood Risk Assessment (SFRA)** – an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. This SFRA will revisit and develop the flood risk identification undertaken in the RFRA and give consideration to a range of potential sources of flooding. An initial flood risk assessment, based on the identification of Flood Zones, will also be carried out for those areas zoned for development. Where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then a site-specific FRA will be recommended, which will necessitate a detailed flood risk assessment.
- **Site Specific Flood Risk Assessment (FRA)** – site or project specific flood risk assessment to consider all types of flood risk associated with the site and propose appropriate site management and mitigation measures to reduce flood risk to and from the site to an acceptable level. If the previous tiers of study have been undertaken to appropriate levels of detail, it is highly likely that the site-specific FRA will require detailed channel and site survey, and hydraulic modelling.

4 Data Collection and Review

This section reviews the data collection and the flood history for the settlement, so that any additional information on flooding can be included within this SFRA. It will confirm the extent of extreme flooding (through the Flood Zone mapping) and key sources of flood risk.

Table 4-1: Available Flood Data for Zone Development

Description	Coverage	Robustness	Comment on usefulness
Portarlinton FRS	Portarlinton Town & Environs	Modelling best available and outputs will allow informed decisions to be made on zoning objectives. Design water levels can inform decisions relating to raising land and setting finished floor levels.	Provides the most up to date and accurate flood information available for Portarlinton.
CFRAM study, OPW	Includes Portarlinton town	Moderate	Superseded by the Portarlinton FRS described above.
Historical event outlines and point observations and reports	Various. Includes records from CCC sources.	Indicative	Can be indirectly used to validate flood zones and identify non-fluvial and tidal flooding.

Table 4-2: Other Available Data

Description	Coverage	Robustness	Comment on usefulness
GSI Groundwater and Surface Water flood information	Full Study Area	Moderate	Provides both historic and predictive flood extents for groundwater and historic surface water flooding.
Alluvial Soils Maps	Full Study Area	Low	Used to provide indication of risk in areas with no other mapping available.
Groundwater vulnerability maps	Broad scale, County wide	Moderate	Initial assessment of groundwater vulnerability. Provides a screening tool for use in FRA.
Historic Flood Records including photos, aerial photos and reports.	Coverage of most of LAP area from 2009 flood event and spot coverage for other events	Various	Highly useful oversight of historic flooding issues provided by the Local Authority.

LiDAR height model	Study area	High	Aerial survey is used to appraise the topography and identify low spots, floodplain and areas potentially susceptible to flooding.
Arterial Drainage Benefiting land maps	Study Area	Low	Useful proxy dataset used to review flood extents. Shows land which would (or has) benefited from a drainage scheme. This is not based on a 'design flood' (i.e. the events do not have a return period), but indicate low-lying, poorly drained land. It is not the same as lands which are protected by a flood relief scheme.

The Flood Zone mapping for Portarlinton is solely derived from the Flood Relief Scheme dataset. All sources of available flood mapping were reviewed, and the best available dataset is used.

During the site visit (attended by Local Authority Engineers and Planners) the flood mapping was appraised on site by an experienced flood risk manager and professional opinion and judgement has been used to develop the recommendations within the Settlement Review of Section 8.

The review of the suite of flood risk data has been developed as a spatial planning tool to guide the Local Authority in making land-use zoning and development management decisions. The data sets have been deemed appropriate for the planning decisions being made at this stage of the plan making process and where flood risk is identified the following approach has been undertaken;

- Application of the Justification Test and/or;
- Further detailed analysis, or;
- Rezoning to a less vulnerable use, or;
- Further assessment at Development Management stage in limited circumstances, where it has been determined that development should be possible in principle, taking into account a site specific opinion.

4.1 Historic Flooding

A number of areas in Portarlinton have been affected by flooding historically. Several sources were consulted to identify previous flood events including the OPW floodinfo.ie website, newspaper articles and previous flood studies. Floodinfo.ie provides information on historical flood events across the country and formed the basis of the Regional Flood Risk Assessment. Information is provided in the form of reports and newspaper articles which generally relate to rare and extreme events.

Table 4-3: Flood History based on site visit and OPW floodinfo data

Location	Start Date	Description
Portarlinton	January 2021	Botley Lane
Portarlinton	November 2017	Spa Street , Spa Bridge and multiple places in Portarlinton
Portarlinton	August 2008	Laois County Council yard, the swimming pool and on roads and properties around Spa Bridge and Barrow Bridge
Portarlinton	January 2005	River Barrow between Bog Lane and Kenny's Lane
Portarlinton	Recurring	Barrow Avondale.
Portarlinton	Recurring	Barrow Mill Island.
Portarlinton	Recurring	Barrow Buttle Lane
Portarlinton	Recurring	Barrow Fire station
Portarlinton	Recurring	Barrow Spa Street
Portarlinton	Recurring	Barrow People's Park
Portarlinton	Recurring	Barrow Edenderry Road,
Portarlinton	Recurring	Barrow Droughill
Portarlinton	Recurring	Barrow Kilnacourt
Portarlinton	January 1995	River Barrow burst its banks
Portarlinton	February 1990	Patrick and Spa Streets were flooded and two premises on Lower Main Street
Portarlinton	December 1968	Spa Street
	December 1954	River Barrow burst its banks flooding hundreds of acres of land in the area.

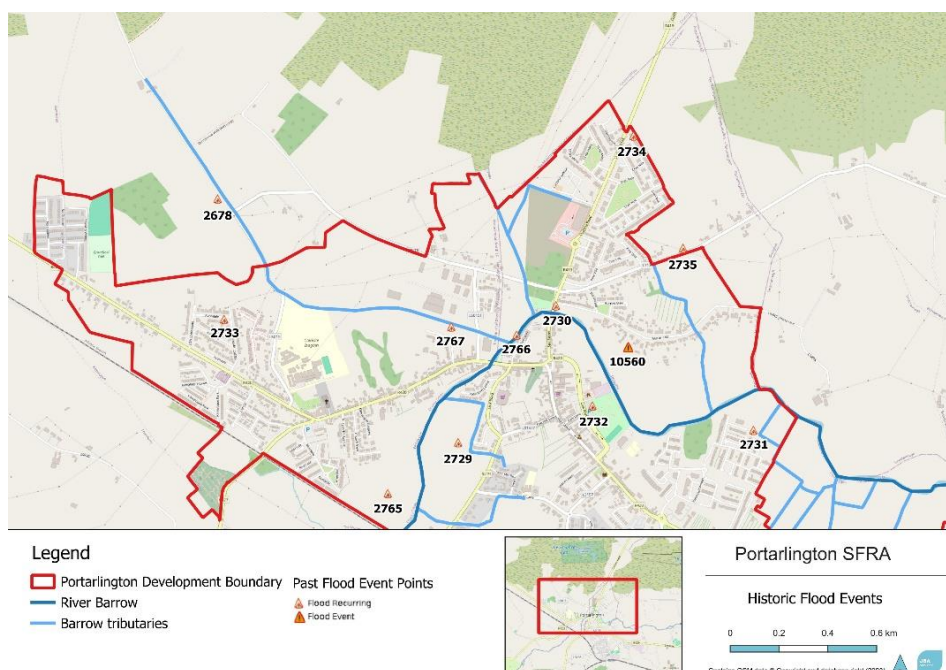


Figure 4-1: Historic Flood Events in Portarlinton

A detailed review of historic flooding is included in appendix B.



Figure 4-2: Aerial photograph of flooding August 2008



Figure 4-3: River Barrow at Industrial Estate, Buttle Lane, January 2005



Figure 4-4: River between Bog Lane and Kenny's Lane January 2005



Figure 4-5: River Barrow at Mill Island, January 2005



Figure 4-6: River Barrow at Mill Island, Portarlinton January 2004

4.2 GSI Groundwater Flood

The winter of 2015/2016 saw the most extensive groundwater flooding ever witnessed in Ireland. The lack of data on groundwater flooding and fit-for-purpose flood hazard maps were identified as serious impediments to managing groundwater flood risk in vulnerable communities. Geological Survey Ireland - in collaboration with Trinity College Dublin and Institute of Technology Carlow - initiated the groundwater flood project GWflood to address these deficits. Data available as a result of the project, including national-scale flood maps for both historic and predictive groundwater flooding.

The historic groundwater flood map is primarily based on the winter 2015/2016 flood event, which in most areas represented the largest groundwater flood event on record. The map was produced based on the SAR imagery of the 2015/2016 event as well as any available supplementary evidence.

The predictive groundwater flood map presents the probabilistic flood extents for locations of recurrent karst groundwater flooding. It consists of a series of stacked polygons at each site representing the flood extent for specific AEP's mapping floods that are expected to occur every 10, 100 and 1000 years (AEP of 0.1, 0.01, and 0.001 respectively). The map is focussed primarily (but not entirely) on flooding at seasonally inundated wetlands, known as turloughs. Sites were chosen for inclusion in the predictive map based on existing turlough databases as well as manual interpretation of SAR imagery.

The mapping process tied together the observed and SAR-derived hydrograph data, hydrological modelling, stochastic weather generation and extreme value analysis to generate predictive groundwater flood maps for over 400 qualifying sites. It should be noted that not all turloughs are included in the predictive map as some sites could not be successfully monitored with SAR and/or modelled. The predictive mapping is displayed below in Figure 4-7 and confirms that there is no predicted or historic groundwater flood groundwater flooding within the LAP boundary.

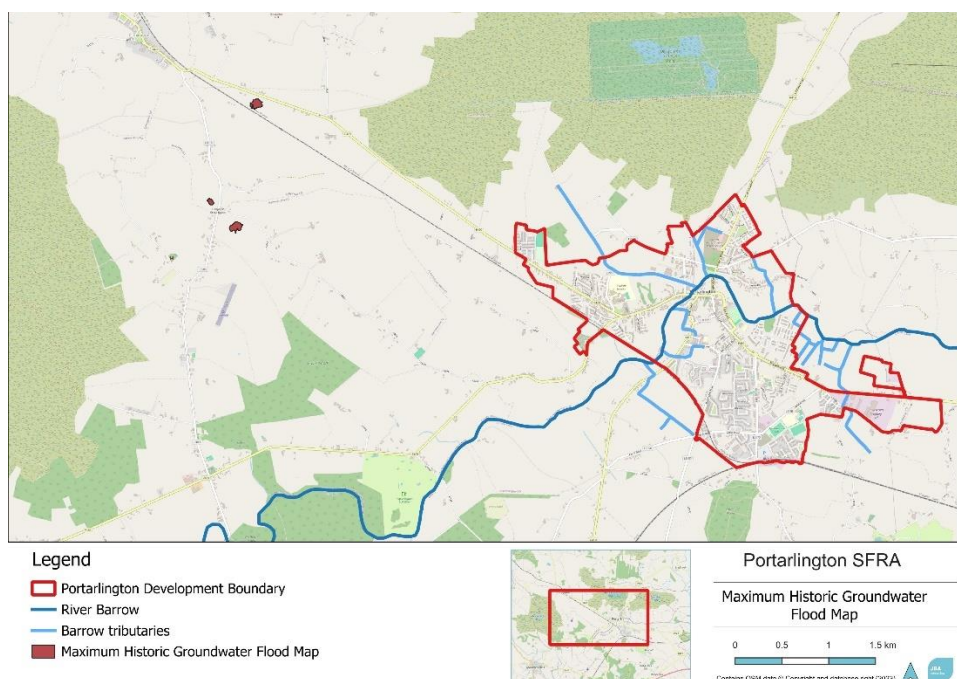


Figure 4-7: Maximum Historic Groundwater Flooding

4.3 GSI Surface Water Flooding

Geological Survey Ireland - in collaboration with Trinity College Dublin and Institute of Technology Carlow - initiated the groundwater flood project GW Flood to address deficits in groundwater flooding and fit-for-purpose flood hazard maps.

In addition to the historic groundwater flood map, the flood mapping methodology was also adapted to produce a surface water flood map of the 2015/2016 flood event. This flood map encompasses fluvial and pluvial flooding in non-urban areas and has been developed as a separate product. The historic surface water flood map is displayed within Figure 4-8.

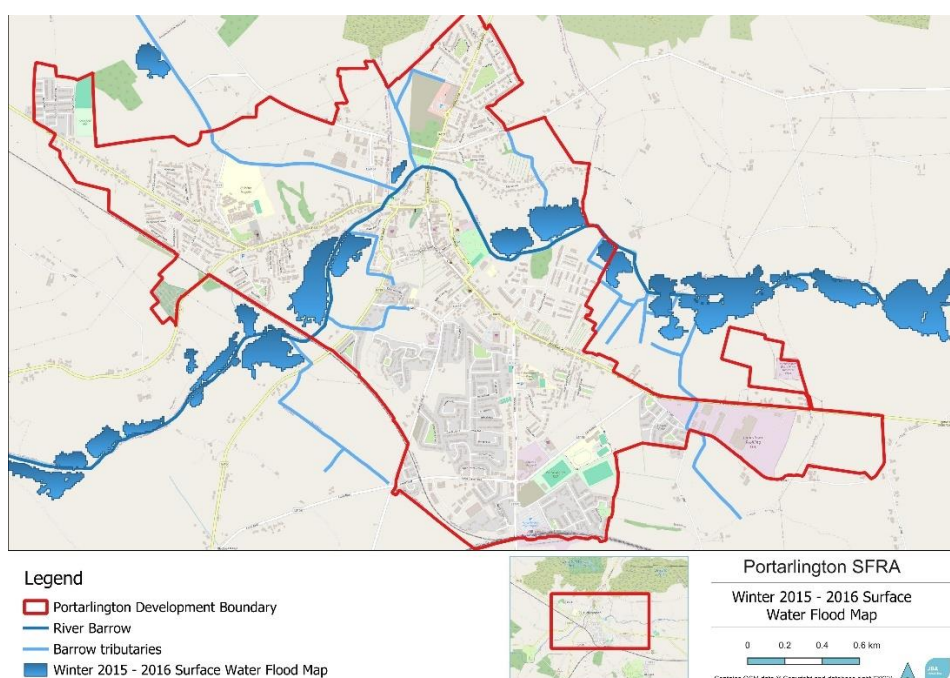


Figure 4-8: Winter 2015-2016 SAR Surface Water Flood Map (GSI)

4.4 CFRAM & The Portarlington Flood Relief Scheme Flood Mapping

In 2011 the OPW commenced appointment of consultants to carry out a more detailed flood risk assessment on key flood risk areas. This work was undertaken under the CFRAM programme across seven river basin districts in Ireland.

A set of flood maps was published for Portarlington and this led to a Management Plan recommending a financially viable Flood Relief Scheme (FRS). The FRS has now received funding and is in progress. The CFRAM flood maps are now superseded by the FRS which added greater detail, however this was not valid for the site at Portarlington north detailed in Portarlington North 7.3. Data elsewhere remained the best available. Due to changes to the ground levels of the Portarlington north site, the FRS consultant prepared updated flood extent for use within the SFRA. The updated FRS extents superseded the original FRS extents.

The proposed scheme for Portarlington that may be implemented after project-level assessment, planning or Exhibition (to be defined under the formal Portarlington Flood Relief Scheme) is described below:

The proposed measures will protect at risk properties by a series of hard defences consisting of flood embankments and walls. These hard defences would be set back from the river channel where possible and would protect to the 1% AEP fluvial flood event.

This option will provide a 1% Fluvial AEP Design standard to all properties within the AFA, identified as being at risk from this source. The preferred option is shown in Figure 4-9 and will have the following methods applied.

- Construct new flood defence walls and embankments.
- Removal and replacement of culverts.

- New culvert.
- Creation of a formalised floodplain to the south of the Blackstick Drain. Diversion of 500m length of the existing drain through the proposed floodplain. Bridge removal and replacement to accommodate existing access⁴.

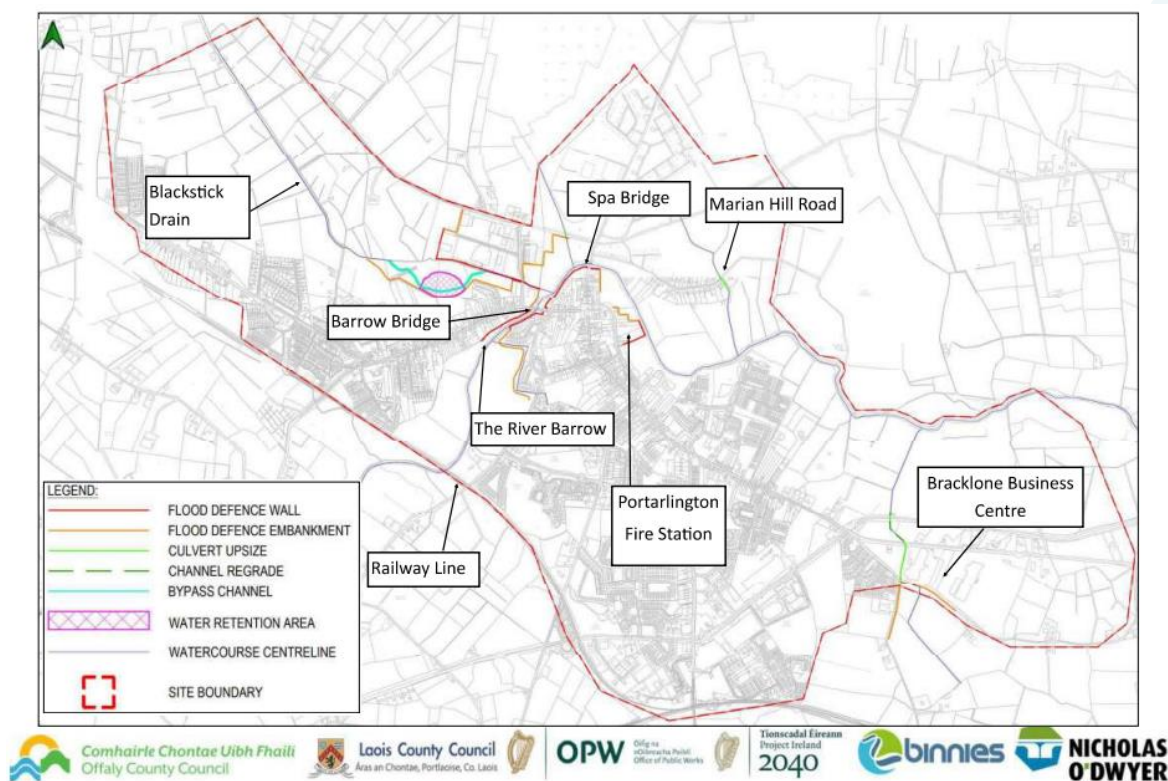


Figure 4-9: : CFRAM Preferred option Portarlinton

4.5 Sources of Flooding

This SFRA has reviewed flood risk from fluvial, pluvial and groundwater sources.

Flooding events have become more pronounced in Ireland, and County Laois and Offaly, in recent years. This demonstrates the need to consider all sources of flood risk, alone and in combination, when considering development within the area. Climate change risks also need to be considered at a strategic and site-specific scale. Climate change is discussed in Section 6.7 in relation to incorporation of climate change into the SFRA. A comment on the likely impacts of climate change, on a settlement basis, has been provided in Section 7.

⁴ Binnies UK and Nicholas O' Dwyer (2024) *Portarlinton Flood relief Scheme: Current progress and Key Objectives*, p.8. Available at: https://www.floodinfo.ie/frs/media/filter_public/02/36/0236dbc1-f7c8-4b55-a7a0-8caad71f6e74/pcd3_book.pdf [Accessed 07 May 2024].

4.5.1 Fluvial Flooding

The main sources of fluvial flood risk come from the potentially limited capacity of the existing river reaches and culverts and the limited outflow capacities of pumping stations.

Fluvial flood risk to Portarlinton emanates from flooding during extreme events. As the River Barrow passes through Portarlinton town, out of bank flooding occurs due to insufficient channel capacity. Receptors are also at risk at the downstream extent of the Blackstick Drain due to a back water effect from the River Barrow. There are a significant number of residential and business properties affected within this AFA, including a Health Centre. Also situated within the floodplain are many social amenity sites, several roads including two regional roads and cultural heritage assets⁵.

4.5.2 Pluvial Flooding

Flooding of land from surface water runoff is usually caused by intense rainfall that may only last a few hours. The resulting water follows natural valley lines, creating flow paths along roads and through and around developments and ponding in low spots, which often coincide with fluvial floodplains. Any areas at risk from fluvial flooding will almost certainly be at risk from surface water flooding. There is limited historic records of pluvial flooding and the GSi surface water mapping aligns with the fluvial floodplain. Risk from pluvial flooding is not significant.

4.5.3 Flooding from Drainage Systems

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its discharge capacity, it becomes blocked or it cannot discharge due to a high-water level in the receiving watercourse.

Flooding in urban areas can also be attributed to sewers. Sewers have a finite capacity which, during certain load conditions, will be exceeded. In addition, design standards vary and changes within the catchment areas draining to the system, in particular planned growth and urban creep, will reduce the level of service provided by the asset. Sewer flooding problems will often be associated with regularly occurring storm events during which sewers and associated infrastructure can become blocked or fail. This problem is exacerbated in areas with undercapacity systems. In the larger events that are less frequent but have a higher consequence, surface water will exceed the sewer system and flow across the surface of the land, often following the same flow paths and ponding in the same areas as overland flow.

Foul sewers and surface water drainage systems are spread extensively across the urban areas with various interconnected systems discharging to treatment works and into local watercourses. Risk from this source of flooding is a key issue for all urbanised areas and can be managed by an appropriately detailed stormwater management plan and policy.

4.5.4 Groundwater Flooding

Groundwater flooding is caused by the emergence of water originating from underground and is particularly common in karst landscapes. This can emerge from either point or diffuse locations. The occurrence of groundwater flooding is usually very local and unlike flooding from rivers and the sea, does not generally pose a significant risk to life due to the slow rate at which the water level rises. However,

⁵ The Office of Public Works (2018) *Flood Risk Management plan Barrow* p.22. Available at: https://s3-eu-west1.amazonaws.com/docs.floodinfo.opw/floodinfo_docs/Final_FRMPs_For_Publication/FRMP_Final2018_RiverBasin_14.pdf [Accessed 07 May 2024].

groundwater flooding can cause significant damage to property, especially in urban areas and pose further risks to the environment and ground stability.

Groundwater flooding can persist over a number of weeks and poses a significant but localised issue that has attracted an increasing amount of public concern in recent years. In most cases groundwater flooding cannot be easily managed or lasting solutions engineered, although the impact on buildings can be mitigated against through various measures. There is no predicted or historic groundwater flood groundwater flooding within the JLAP boundary and risk from this source is low.

5 Flood Risk Management Policy

The implementation of the Planning Guidelines throughout the county is achieved through the application of the policies and objectives contained within the JLAP.

The use and application of the policies and guidelines constitutes the formal plan for flood risk management in Portarlinton. This approach has been achieved in the development plan making process

The specific management of risk is discussed for each area of Portarlinton in Section 6.

5.1 Flood Risk Policy JLAP 2025-2031

The implementation of the Planning Guidelines throughout the county is achieved through the application of the policies and objectives contained within the JLAP 2025-2030. Chapter 13 *Infrastructure, Environmental services and flood Risk Management* of the JLAP sets out the Strategic Aims and key Policy Objectives pertaining to Flood Risk Management in County Laois and Offaly which includes the Portarlinton JLAP area.

The specific management of risk is discussed for each area of Portarlinton in Section 6. Below are policies or objectives from the JLAP.

Objective 6.8	Develop and improve flood mitigation measures throughout the town and rural hinterland.
Objective 6.9	Develop and improve flood mitigation measures throughout the town and rural hinterland, in compliance with the Barrow Flood Risk Management Plan (OPW, 2018) and the European Habitats Directive.
Objective 6.12	Development within flood risks areas shall be limited to that appropriate to the level of flood risk, as identified in Map 3 (Land Use Zoning, SAC and Flood Zoning) in accordance with the provisions of the Planning System and Flood Risk Management Guidelines for Planning Authorities (2009), as amended. New development within this area is limited to water-compatible uses in Flood Zone A and less vulnerable or water compatible uses in Flood Zone B except where all criteria of the Plan Making and Development Management Justification Tests have been shown to have been satisfied and a detailed SSFRA has been prepared.
Policy 13.5	Require the submission of a Site-Specific Flood Risk Assessment (FRA), by a suitably qualified and indemnified professional, in areas at risk of flooding in Portarlinton. The assessment shall be prepared in accordance with the Planning System and Flood Risk Management: Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014 (and any future revisions or updates to these Guidelines).
Policy 13.10	Support the mitigation measures outlined in Part 3 of the Justification Tests that: a) Within Flood Zones A and B, highly vulnerable development is limited to extensions, rebuilds and changes of use until the Flood Relief Scheme is completed; and b) Within Flood Zones A and B, bedrooms must be located in the upstairs of two story buildings when extending existing properties;

Policy 13.13	Development within flood risks areas shall be limited to that appropriate to the level of flood risk, as identified in Map 3 (Land use Zoning, SAC and Flood Zoning) in accordance with the provisions of the Planning system and Flood Risk Management Guidelines for Planning Authorities (2009), as amended. New development within this area is limited to water compatible uses in Flood Zone A and less vulnerable or water compatible uses in Flood Zone B except where all criteria of the Plan Making and Development Management Justification Tests have been shown to have been satisfied and a detailed SSFRA has been provided.
Objective 13.4	Manage flood risk in Portarlinton in conjunction with the Office of Public Works (OPW) and in accordance with the requirements of the Planning System and Flood Risk Management: Guidelines for Planning Authorities (2009), Circular PL02/2014, and any future revisions or updates to these Guidelines.

5.2 Surface water Policy

The management of surface and storm water is important so as to avoid increased flood or pollution risk in the storm water network, rivers and streams in the county's towns, villages and rural areas. The Council will require compliance with best practice guidance for the collection, reuse, treatment and disposal of surface waters for all future development proposals.

Traditionally, rain falling on impervious surfaces was directed into a receiving watercourse through surface water drainage systems. While such drainage systems are effective at transferring surface water quickly, they provide only limited attenuation causing the volume of water in the receiving watercourse to increase more rapidly, thereby increasing flood risk.

Sustainable Drainage Systems, commonly known as SuDS is an approach that seeks to manage the water as close as possible to its origin by various engineering solutions that replicate natural drainage processes, before it enters the watercourse. The incorporation of SuDS techniques allows surface water to be either infiltrated or conveyed more slowly to water courses using porous surface treatments, ponds, swales, filter drains or other installations.

SuDS provide an integrated approach which addresses water quantity, water quality, amenity and habitat. The Council will require the application of SuDS in development proposals, for example through reducing the extent of hard surfacing, and using permeable pavements. The following stormwater management policies have been included in the JLAP 2025-2030 from Chapter 13 Infrastructure, Environmental services and flood Risk Management.

Policy 13.1	Require that new developments connect to the public water and wastewater networks in Portarlinton where public mains are available, and subject to connection agreements with Uisce Éireann and compliance with normal planning and environmental criteria.
Policy 13.2	Protect both ground and surface water resources and to work with Uisce Éireann to develop and implement Water Safety Plans to protect sources of public water supply and their contributing catchments.

Policy 13.3	Preserve free from development the wayleaves of all public sewers and all public water mains.
Policy 13.4	Minimise flood risk arising from pluvial (surface water) flooding in Portarlinton by promoting the use of natural flood risk management measures including the use of Sustainable Urban Drainage Systems (SuDS) and nature-based solutions.
Policy 13.12	<p>Ensure that surface water management in new developments, and the design of nature-based solutions, in line with Policy 13.4, reflect the following guidance:</p> <ul style="list-style-type: none"> • Nature Based Management of Urban Rainwater and Urban Water Discharges, A National Strategy (May 2024) • "Implementation of Urban Nature Based Solutions -Guidance Document for Planners, Developers and Developer Agents" LAWPRO (November 2024)

6 Development Management and Flood Risk

In order to guide both applicants and relevant council staff through the process of planning for and mitigating flood risk, the key features of a range of development scenarios have been identified (relating the Flood Zone, development vulnerability and presence or absence of defences). For each scenario, a number of considerations relating to the suitability of the development are summarised below.

It should be noted that this section of the SFRA begins from the point that all lands zoned for development have passed the Justification Test for Development Plans, and therefore passes Part 1 of the Justification Test for Development Management – which states that the land has in the first instance been zoned accordingly in a development plan (that underwent an SFRA). In addition to the general recommendations in the following sections, Section 7 should be reviewed for specific recommendations for individual areas of Portarlinton, including details of the application of the Justification Test and the specific requirements within each area of the settlement.

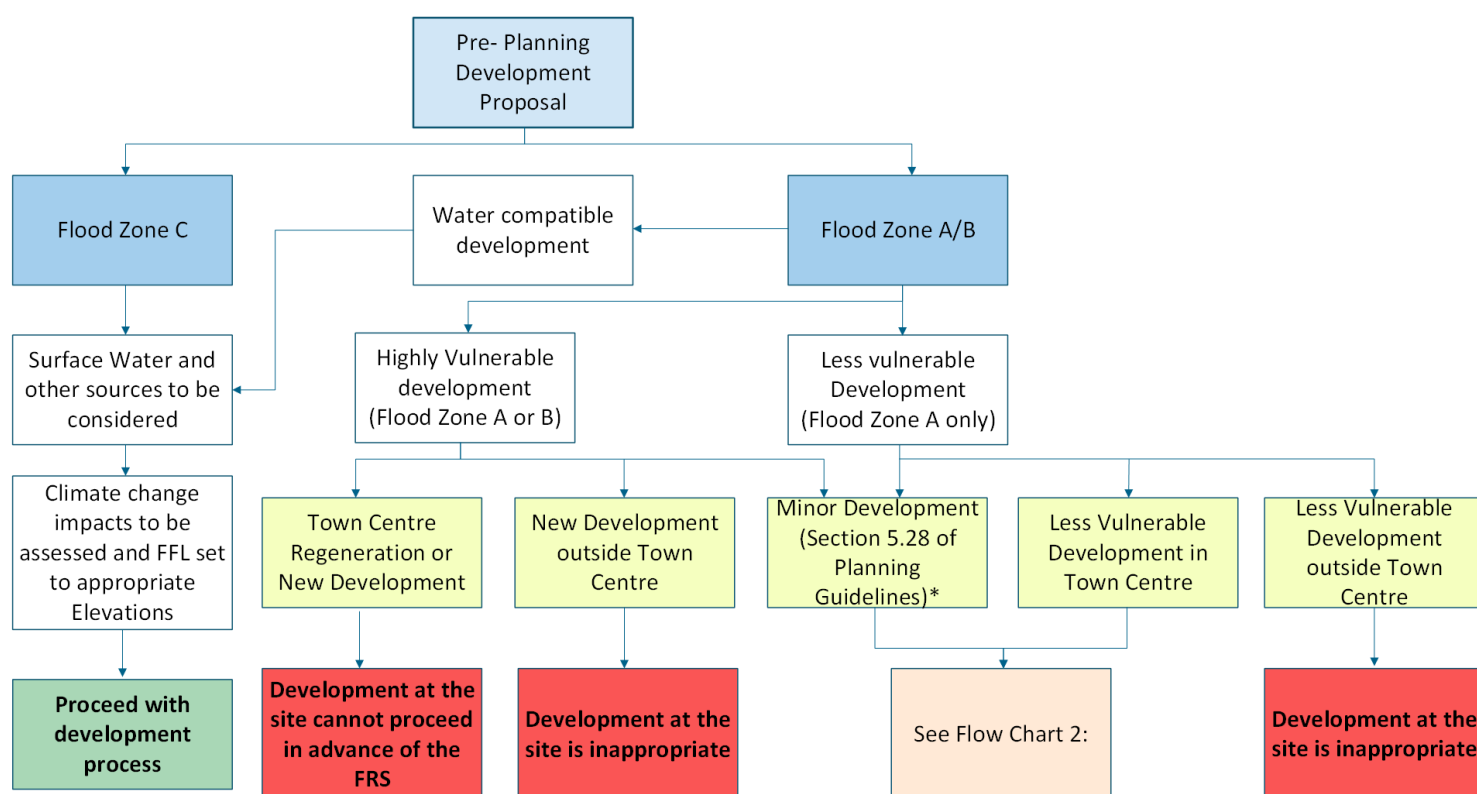
In order to determine the appropriate design standards for a development it may be necessary to undertake a site-specific flood risk assessment. This should include the findings of the Portarlinton FRS which can be used to inform finished floor levels. In other circumstances, for example if there are any changes to the floodplain, a detailed modelling study and flood risk assessment may need to be undertaken. Further details of each of these scenarios, including considerations for the flood risk assessment are provided in the following sections.

6.1 Development Scenarios and Flow Charts

To guide applicants and planning officials through the process of planning for and mitigating flood risk at a site level, the key features of a range of development scenarios have been identified (relating the flood zone, development vulnerability and presence or absence of defences). For each scenario, a number of considerations relating to the suitability of the development are summarised below. The scenarios identified are:

- Development wholly within Flood Zone C and Drainage Impact Assessment
- Minor developments in Flood Zone A or B
- Highly vulnerable development in Flood Zone A or B
- Less vulnerable development in Flood Zone A or B
- Water compatible uses in Flood Zone A or B
- Climate change

These scenarios are supported by flow charts which summarise the decision-making process with regard to flood risk and different vulnerabilities of development. The flow charts are referenced through the following pages and are shown in Figure 6-1 and Figure 6-2 below.



* Minor Development excludes Highly Vulnerable infill development in Flood Zone A/B

Figure 6-1: Flow Chart 1 – Development Management Process

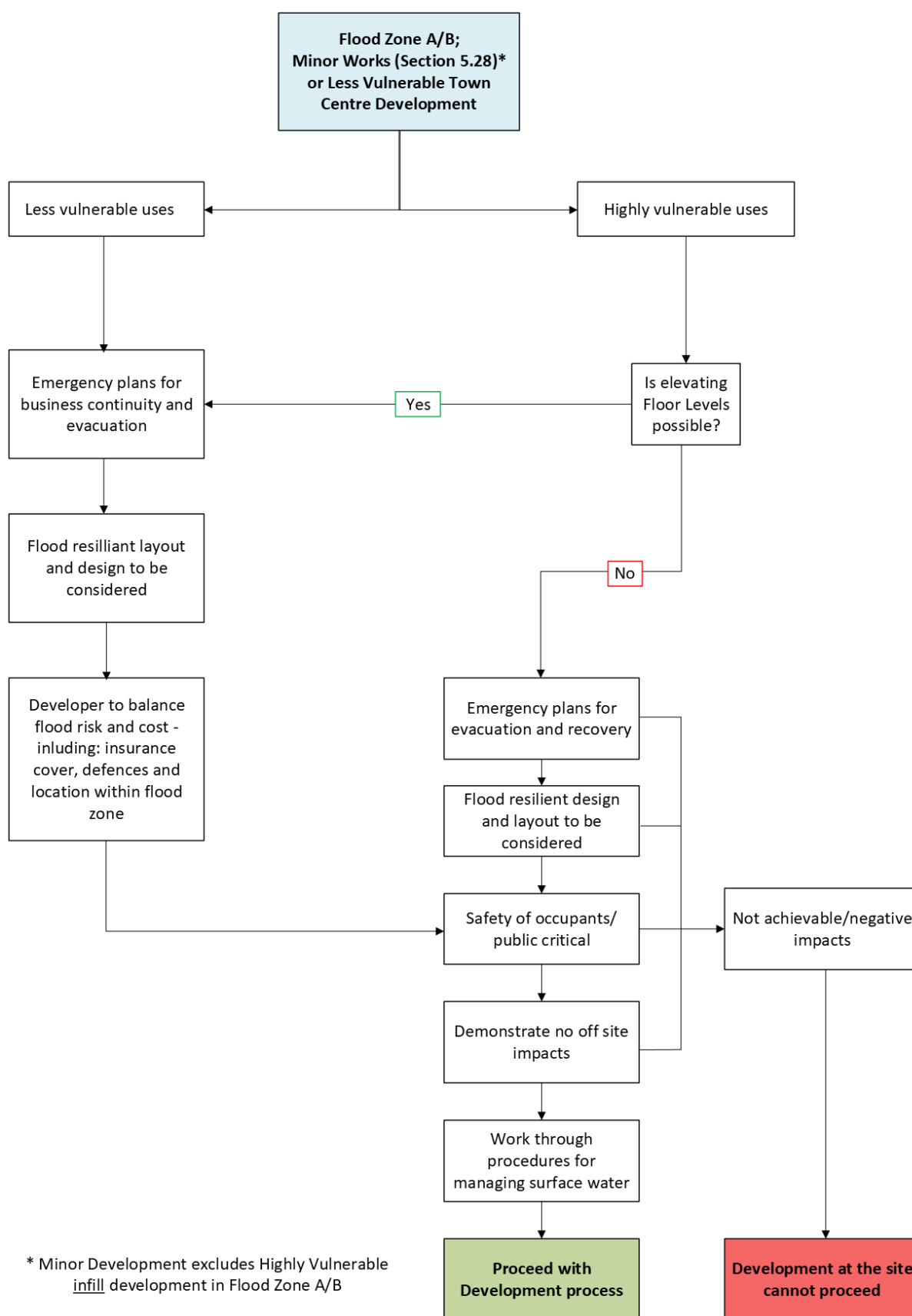


Figure 6-2: Flow Chart 2 – Minor Development in Flood Zone A or B

6.2 Requirements for a Flood Risk Assessment

An appropriately detailed flood risk assessment will be required in support of any planning application. The level of detail will vary depending on the risks identified and the proposed land use. As a minimum, all proposed development, including that in Flood Zone C, must consider the impact of surface water flood risks on drainage design. In addition, flood risk from sources other than fluvial and tidal should be reviewed, including groundwater flooding and/or flooding associated with storm water deficiencies, restrictions or blockages.

For sites within Flood Zone A or B, a site specific "Stage 2 - Initial FRA" will be required, and may need to be developed into a "Stage 3 - Detailed FRA". The extents of Flood Zone A and B are delineated through this SFRA. However, future studies may refine the extents (either to reduce or enlarge them) so a comprehensive review of available data should be undertaken once an FRA has been triggered.

Within the FRA the impacts of climate change and residual risk (including culvert/structure blockage) should be considered and remodelled where necessary, using an appropriate level of detail, in the design of finished floor levels. Further information on the required content of the FRA is provided in the Planning System and Flood Risk Management Guidelines.

Any proposal that is considered acceptable in principle shall demonstrate the use of the sequential approach in terms of the site layout and design and, in satisfying the Justification Test (where required), the proposal will demonstrate that appropriate mitigation and management measures are put in place.

If any unmodelled watercourses are detected on a site and flood risk has consequently not been mapped under the SFRA, it does not mean there is no flood risk present. Instead, a site specific flood risk assessment of appropriate level of detail should be carried out to delineate the Flood Zones and/or suitable mitigation measures (such as finished floor levels). In such locations the Justification Test has not been applied, so development must progress in accordance with the sequential approach and avoid Flood Zone A and B.

6.3 Development in Flood Zones A or B

6.3.1 Minor Developments

Section 5.28 of the Planning Guidelines on Flood Risk Management identifies certain types of development as being 'minor works'. This includes extensions, refits and changes of use. The assessment process for this form of development is provided in Flow Chart 2 (Figure 6-2).

As the proposal relates to existing buildings, the 'Sequential Approach' and 'Justification Test' cannot apply, but an assessment of the risks of flooding should accompany such applications. This must demonstrate that the development would not increase flood risks by introducing significant numbers of additional people into the flood plain and/or putting additional pressure on emergency services or existing flood management infrastructure. The development must not have adverse impacts or impede access to a watercourse, floodplain or flood protection and management facilities. Where possible, the design of built elements in these applications should demonstrate principles of flood resilient design (See 'The Planning System and Flood Risk Management Guidelines for Planning Authorities Technical Appendices, 2009', Section 4 - Designing for Residual Flood Risk).

In many situations, the approach to deal with flooding would involve raising the ground floor levels above the level of extreme river levels. This is likely to cause problems for infill development sites and existing buildings. It is therefore recognised that some flexibility could be allowed and on a site by site basis, and depending on the level of

risk presented. In these cases, the detailed design of the development should reflect the vulnerability of the site in terms of internal layout, materials, fixtures and fittings and internal layout. For high risk areas, less vulnerable uses are encouraged at ground floor levels. A site specific FRA will inform appropriate uses and detailed design and layout.

It should be noted that for residential buildings within Flood Zone A or B, bedroom accommodation is more appropriate at upper floor levels.

For commercial operations, business continuity must be considered, and steps taken to ensure operability during and recovery after a flood event for both residential and commercial developments. Emergency access must be considered as in many cases flood resilience will not be easily achieved in the existing built environment.

All development in the area should follow the wider Laois/Offaly County Council Major Emergency Plan which allows for flood warning and preparedness as the key mitigation response to flood risk as access and egress may not be possible for most parts of Portarlinton in Flood Zone A or B.

Any future planning applications for minor developments in Flood Zone A or B should be subject to an FRA which should follow the general guidance provided in the SFRA and must specifically address the following:

- Flood resilient construction materials and fittings should be considered.
- A site specific emergency plan should be developed for flood events.
- Any development shall also be required to be in accordance with CCC SuDS Policy.

The requirement for providing compensatory storage for minor developments has been reviewed and can generally be relaxed, even where finished floor levels have been raised. This is because the development concerns land which has previously been developed and would already have limited capacity to mitigate flooding and would particularly be the case in tidal risk areas. However, a commentary to this effect must be substantiated in the FRA.

6.3.2 Highly vulnerable development in Flood Zone A or B

Development which is highly vulnerable to flooding, as defined in The Planning System and Flood Risk Management, includes (but is not limited to) dwelling houses, hospitals, emergency services and caravan parks.

As shown in Flow Chart 1 (Figure 6-1), it is not appropriate for new, highly vulnerable development to be located in Flood Zones A or B. Until such time that the Portarlinton FRS is fully operational, highly vulnerable infill or redevelopment/new development within Flood Zone A/B would be premature. This non-structural flood risk management measure is a response to the current level of risk present in Portarlinton and the inability to effectively manage it on a structural level until the FRS is complete.

6.3.3 Less vulnerable development in Flood Zone A or B

This section applies to less vulnerable development in Flood Zone A which has passed the Justification Test for development plans, and less vulnerable development in Flood Zone B, where this form of development is appropriate, and the Justification Test is not required. Development which is less vulnerable to flooding, as defined in The Planning Guidelines, includes (but is not limited to) retail, leisure and warehousing and buildings used for agriculture and forestry (see Table 3-3 for further information). This category includes less vulnerable development in all forms, including refurbishment or infill development, and new development.

As shown in Flow Chart 1 (Figure 6-1) the approach for any new/infill less vulnerable development (prior to the completion of the FRS) under Town Centre zoning only (not other areas of the town) within Flood Zone A reflects that the risk is lower. As such,

development can proceed on the basis that any future development should be subject to an FRA which should follow the general guidance provided in Section 6.8 of the SFRA and any additional points under the Justification Test as listed in the appendix.

And as with highly vulnerable development in Flood Zone A/B, there can be no further infill or redevelopment/new development within Flood Zone A/B until the Portarlington FRS is fully operational, any such development would be premature. This non-structural flood risk management measure is a response to the current level of risk present in Portarlington and the inability to effectively manage it on a structural level until the FRS is complete.

6.3.4 Water compatible uses in Flood Zone A or B

Water compatible uses can include the non-built environment, such as open space, agriculture and green corridors which are appropriate for Flood Zone A and B and are unlikely to require a flood risk assessment. However, there are numerous other uses which are classified as water compatible, but which involve some kind of built development, such as lifeguard stations, docks and other activities requiring a waterside location.

In other situations, works to an area of open space may result in changes to the topography which could lead to loss in flood plain storage and/or impacts on flood conveyance. Given the sensitivity of the floodplain and the ongoing Portarlington FRS it is not considered appropriate for there to be any further loss of floodplain nor any interruption to conveyance routes. Compensatory storage in adherence with the Planning System and Flood risk Management Guidelines may be appropriate in exceptional circumstances. The Justification Tests are not required for such development, but an appropriately detailed flood risk assessment is required clearly demonstrating compliance with the above conditions and ensuring no increase in flood levels or risk to surrounding lands. Any proposals should consider mitigation measures such as development layout and finished floor levels, access, egress and emergency plans. Climate change and other residual risks should also be considered within the SSFRA.

6.4 Development in Flood Zone C

Where a site is within Flood Zone C, but adjoining or in close proximity of a watercourse, there could be a risk of flooding associated with factors such as future scenarios (climate change), blocking of a bridge or culvert or other residual risk. Risk from sources other than fluvial and coastal must also be addressed for all development in Flood Zone C, including groundwater flooding and/or flooding associated with storm water deficiencies, restrictions or blockages. As a minimum in such a scenario, an assessment of flood risk should be undertaken which will screen out possible sources of flood risk and where they cannot be screened out it should present mitigation measures. The most likely mitigation measure will involve setting finished floor levels to a height that is above the 1% AEP fluvial event level or 2% AEP tidal event with an allowance for climate change and freeboard, or to ensure a step up from road level to prevent surface water ingress. Design elements such as channel maintenance or trash screens may also be required. Evacuation routes in the event of inundation of surrounding land should also be detailed.

Guidance for the assessment of surface water risk is provided in Section 6.5.

The impacts of climate change should be considered for all proposed developments. A development which is currently in Flood Zone C may be shown to be at risk when an allowance for climate change is applied. Details of the approach to incorporating climate change impacts into the assessment and design are provided in Section 6.7.

6.5 Drainage Impact Assessment

All proposed development, including that in Flood Zone C, must consider the impact of surface water flood risks on drainage design. Particular attention should be given to development in low-lying areas which may act as natural ponds for collection of runoff. The drainage design should ensure no increase in flood risk to the site, or the downstream catchment. Reference should be made to the relevant policies in the Development Plan and any forthcoming Surface Water Strategy for details of the assessment process.

Where surface water attenuation forms part of the system, consideration should be given to the level of the outfall to the watercourse. If this outfall will be below flood levels, an assessment of the additional storage required for the period when the outfall is submerged and free discharge is not possible, will need to be made.

For larger sites (i.e. multiple dwellings or commercial units) master planning should ensure that existing flow routes are maintained through the use of green infrastructure. Where possible, and particularly in areas of new development, floor levels should at a minimum be 300mm above adjacent roads and hard standing areas to reduce the consequences of any localised flooding. Where this is not possible, an alternative design appropriate to the location may be prepared.

6.6 Checklist for Applications for Development in Areas at Risk of Flooding

This section applies to both highly and less vulnerable development in Flood Zone A and highly vulnerable development in Flood Zone B that satisfy the following:

- Meet the definition of Minor Development; or
- Have passed the Justification Test for Development Plans and be able to pass the Justification Test for Development Management to the satisfaction of the Planning Authority.

The following checklist is required for all development proposals:

- The SSFRA be carried out by an appropriately qualified Engineer with relevant FRA experience (as deemed acceptable by the Planning Authority), in accordance with the County level SFRA and the Planning Guidelines.
- Demonstration that the specific objectives or requirements for managing flood risk set out in Section 5 of this SFRA have been complied with, including an assessment of residual risks.
- Preparation of access, egress and emergency plans which are appropriate to the source of flooding and lead time to issue a warning, vulnerability of the development and its occupiers, the intensity of use and the level of flood risk.
- An assessment of the potential impacts of climate change and the adaptive capacity of the development.
- Compliance with C753 CIRIA SUDS guide, GDSDS and inclusion of Nature Based Solutions and SuDS Policy.

6.7 Climate Change

Ireland's climate is changing and analysis of the potential impacts of future climate change is essential for understanding and planning. Climate change should be considered when assessing flood risk and in particular residual flood risk. Areas of residual risk are highly sensitive to climate change impacts as an increase in flood levels will increase the likelihood of defence failure.

The Planning Guidelines recommend that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. Specific advice on the expected impacts of climate change and the allowances to be provided

for future flood risk management in Ireland is given in the OPW Climate Change Sectoral Adaptation Plan⁶.

The OPW guidance recommends that two climate change scenarios are considered. These are the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). In all cases, the allowances should be applied to the 1% AEP fluvial flows. Where a development is critical or extremely vulnerable the impact of climate change on 0.1% AEP flows should also be tested.

These climate change allowances are particularly important at the development management stage of planning and will ensure that proposed development is designed and constructed according to current local and national Government advice.

Assessment of climate change impacts can be carried out in a number of ways. For watercourses that fall within the Portarlington FRS study area, flood extents and water levels for the MRFS and HEFS have been developed. Where access to the hydraulic river model is readily available a run with climate change could be carried out, or hand calculations undertaken to determine the likely impact of additional flows on river levels. In a coastal or tidal scenario, a 0.5m for MRFS or 1m for HEFS plus allowance for land movement, increase to the 0.5% AEP sea level can be assessed based on topographic levels.

Table 6-1: Climate Change Allowances by Vulnerability and Flood Source

Development vulnerability	Fluvial climate change allowance (increase in flows)	Tidal climate change allowance (increase in sea level)	Storm water / surface water
Less vulnerable	20%	0.5m (MRFS) + 50mm for land movement	The Surface water management plan including details of climate change allowances is under preparation
Highly vulnerable	20%	0.5m (MRFS) + 50mm for land movement	
Critical or extremely vulnerable (e.g. hospitals, major sub-stations, blue light services)	30%	1.0m (HEFS) + 50mm for land movement	
Note: There will be no discounting of climate change allowances for shorter lifespan developments.			

6.7.1 Mid – Range Future Scenario(MRFS)

The 1% AEP + climate change (MRFS) outline is displayed below in Figure 6-3. The area most affected is the additional flow route through the town centre area. This area will be defended by the flood relief scheme which will allow for climate change adaptation. Elsewhere there is a general small increase to the fringes of the outlines.

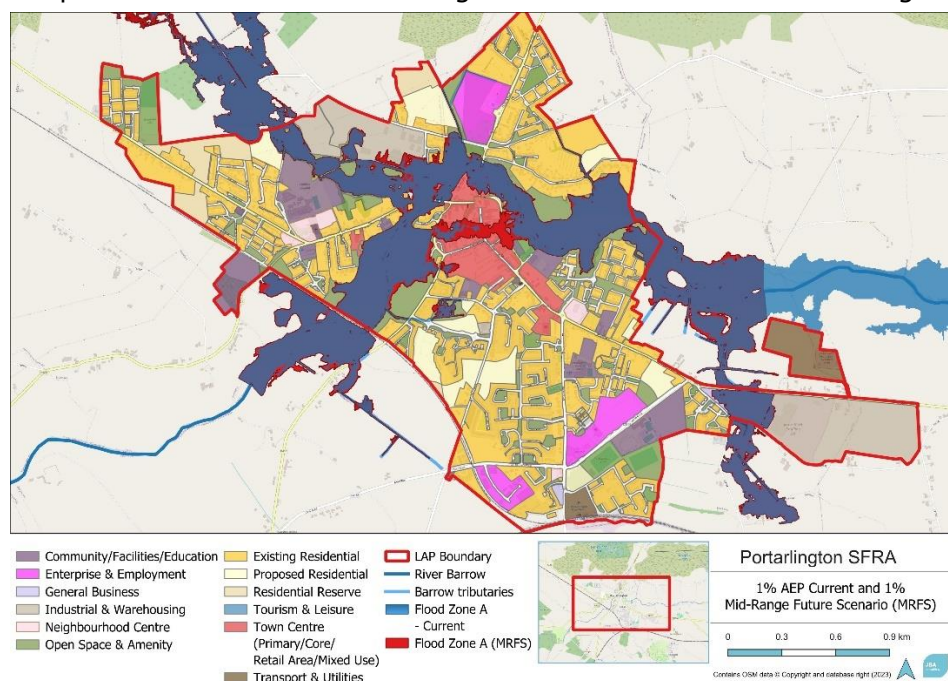


Figure 6-3: Portarlington FRS 1% AEP Current vs 1% MRFS climate change

6.7.2 High – End Future Scenario (HEFS)

The 1% AEP + climate change (HEFS) outline is displayed below in Figure 6-4. Once again, the area most affected is the additional flow route through the town centre area. This area will be defended by the flood relief scheme which will allow for climate change adaptation. Elsewhere there is a general small increase to the fringes of the outlines.

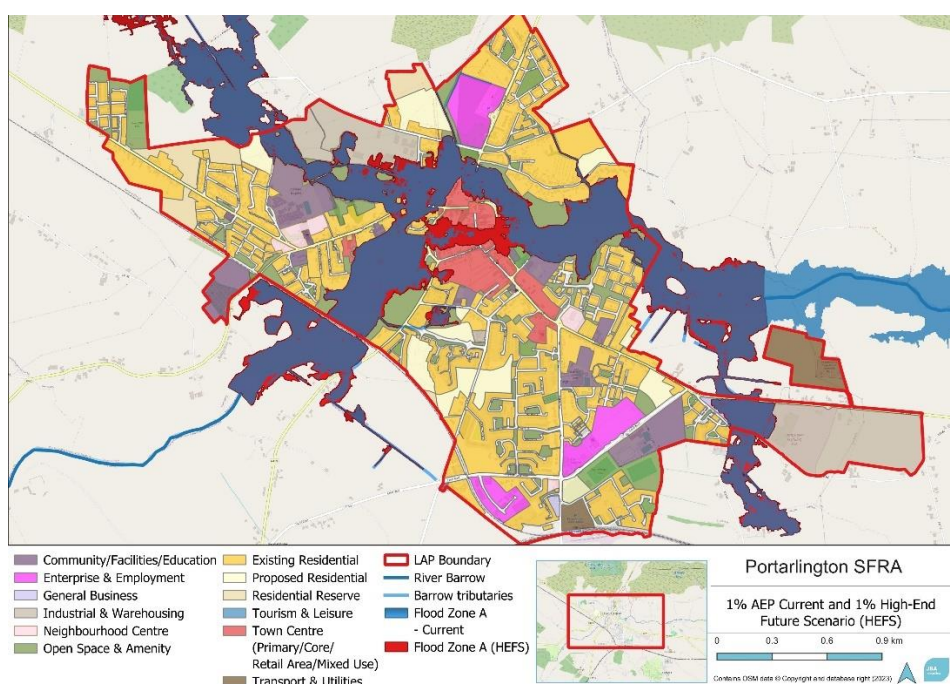


Figure 6-4: Portarlinton FRS 1% AEP Current vs 1% HEFS Climate Change

6.8 Flood Mitigation Measures at Site Design

For any development proposal in an area at moderate or high risk of flooding that is considered acceptable in principle, it must be demonstrated that appropriate mitigation measures can be put in place and that residual risks can be managed to acceptable levels. Guidance on what might be considered 'acceptable' has been given in a number of sections in this document.

To ensure that adequate measures are put in place to deal with residual risks, proposals should demonstrate the use of flood-resistant construction measures that are aimed at preventing water from entering a building and that mitigate the damage floodwater causes to buildings. Alternatively, designs for flood resilient construction may be adopted where it can be demonstrated that entry of floodwater into buildings is preferable to limit damage caused by floodwater and allow relatively quick recovery.

Various mitigation measures are outlined below and further detail on flood resilience and flood resistance are included in the Technical Appendices of the Planning Guidelines, The Planning System and Flood Risk Management⁷.

It should be emphasised that measures such as those highlighted below should only be considered once it has been deemed 'appropriate' to allow development in a given location. The Planning Guidelines do not advocate an approach of engineering solutions in order to justify the development which would otherwise be inappropriate.

⁷ The Planning System and Flood Risk Management Guidelines for Planning Authorities, Technical Appendices, November 2009

6.8.1 Site Layout and Design

To address flood risk in the design of new development, a risk based approach should be adopted to locate more vulnerable land use to higher ground while water compatible development i.e. recreational space, can be located in higher flood risk areas.

The site layout should identify and protect land required for current and future flood risk management. Waterside areas or areas along known flow routes can be used for recreation, amenity and environmental purposes to allow preservation of flow routes and flood storage, while at the same time providing valuable social and environmental benefits.

At an individual building level, assigning a water compatible use, such as open public realm, or less vulnerable use to the ground floor level, along with suitable flood resilient construction, is an effective way of raising vulnerable living space above design flood levels. It can however have an impact on the streetscape. The provision of safe access and egress is a critical consideration in allocating ground floor uses. It is noted that for development in Flood Zone A or B this is only relevant for minor developments.

6.8.2 Ground levels, floor levels and building use

Modifying ground levels to raise land above the design flood level is a very effective way of reducing flood risk to the particular site in question. Given the zoning and restrictions put in place prior to the delivery of the FRS it is unlikely that compensatory storage will be encountered.

In most areas of fluvial flood risk, conveyance or flood storage would be reduced locally and could have an adverse effect on flood risk off site. There are a number of criteria which must all be met before this is considered a valid approach:

- Development at the site must have been justified through this SFRA based on the existing (unmodified) ground levels.
- The FRA should establish the function provided by the floodplain. Where conveyance is a prime function then a hydraulic model will be required to show the impact of its alteration.
- Compensatory storage should be provided on a level for level basis to balance the total volume that will be lost through infilling where the floodplain provides static storage. There should be no overall loss of floodplain storage volume as a result of the development in the 1% AEP event and impacts of the amended storage should be tested for the 0.1% AEP event to ascertain no significant increase in risks associated with the extreme event.
- The provision of the compensatory storage should be in close proximity to the area that storage is being lost from (i.e. within the same flood cell).
- The land proposed to provide the compensatory storage area must be within the ownership/control of the developer.
- The land being given over to storage must be land which does not flood in the 1% AEP event (i.e. Flood Zone B or C).
- The compensatory storage area should be constructed before land is raised to facilitate development. This is to ensure no temporary loss of flood storage volume during construction.

In some sites it is possible that ground levels can be re-landscaped to provide a sufficiently large development footprint within Flood Zone C. However, it is likely that in other potential development locations there is insufficient land available to fully compensate for the loss of floodplain. In such cases it will be necessary to reconsider the layout or reduce the scale of development, or propose an alternative and less vulnerable type of development. In other cases, it is possible that the lack of

availability of suitable areas of compensatory storage means the target site cannot be developed and should remain open space.

Finished floor levels should be assessed in relation to the specific development, but the minimum levels set out in Table 6-2 should apply. It should be noted that in certain locations it may be appropriate to adopt a more precautionary approach to setting finished floor levels, for example where residual risks associated with bridge blockage occur, and this should be specifically assessed in the FRA. In other locations detailed modelling may demonstrate a lower finished floor level is acceptable; this should be discussed with the Local Authority on a case by case basis. It is also noted that typically finished floor levels should be set a minimum of 300mm above surrounding ground levels to prevent ingress of surface water.

Table 6-2: Recommended Minimum Finished Floor Levels

Scenario	Finished floor level to be based on
Fluvial, undefended	1% AEP flood + climate change (as Table 6-1) + 300mm freeboard.
Fluvial, defended	1% AEP flood + 300mm freeboard. Climate change does not need to be included, provided it is included in the defence height or adaption plan for the scheme. Where a breach model has been developed to further understand risks, FFL may be set based on model outputs.

6.8.3 Raised Defences

Construction of raised defences (i.e. flood walls and embankments) traditionally has been the response to flood risk. However, this is not a preferred option on an ad-hoc basis where the defences to protect the development are not part of a strategically led flood relief scheme. Portarlinton Flood Relief Scheme has gone through the process of design and development, the planning process is scheduled for completion in 2024/2025. These defences will be part of a robust and long term strategy for the management of flood risk.

6.8.4 Flood Resilient and Resistant Development

Depending on the scale of actual and residual risk, flood resilient and resistant design measures may be an appropriate response but this will mostly apply to minor development.

Design can include for wet-proofing of a building to make it flood resilient and reduce the impact of flooding. For example, use of water-resistant materials such as tiles on floors and walls that can be easily washed down and sanitised after a flood event, and the installation of electrical sockets and other circuits at higher levels, with power wires running down from ceiling level rather than up from floor level.

Flood resistance measures can also be incorporated such as the provision of temporary and permanent flood barriers, but would not be considered acceptable as the primary means of managing flood risk. Permanent barriers, in the form of steps (or ramps) at doorways, rendered brick walls and toughened glass barriers, can help prevent flood water entering buildings. Alternatively, temporary barriers can be fitted into doorways and windows, with discrete permanent fixings that keep architectural impact to a minimum. However, flood warning becomes a very important issue when dealing with temporary or demountable defences and such measures are only suitable for relatively shallow depths of flooding. The suitability of temporary defences should be assessed on a case by case basis in conjunction with Laois and Offaly County Councils.

Whilst it may be desirable to retro-fit flood resilience and resistance to an existing development, for example as part of a change of use application, it is often difficult and costly to achieve, with options limited depending on the age and construction of the existing building.

Demountable or temporary barriers are not an appropriate means of managing climate change risks, which should be addressed through either site or building design, or as part of a completed Flood Relief Scheme, which provides flood protection to the proposed development, this will be the principal source of protection in Portarlinton and the SFRA is focussed on restricting significant new highly vulnerable development prior to the construction of the FRS.

6.8.5 Emergency Flood Response Plans

In some instances, and only when all parts of both the Plan Making and Development Management Justification Tests have been passed, it may be necessary for an emergency flood response plan to be prepared to support other flood management measures within the context of a less vulnerable or water compatible development. An emergency response plan may be required to trigger the operation of demountable flood defences to a less vulnerable development, evacuation of a car park or closure of a business or retail premises.

The emergency plan will need to detail triggers for activation, including receipt of a timely flood warning, a staged response and to set out the management and operational roles and responsibilities. The plan will also need to set out arrangements for access and egress, both for pedestrians, vehicles and emergency services. The

details of the plan should be based on an appropriately detailed assessment of flood risk, including speed of onset of flooding, depths and duration of inundation.

However, just because it is possible to prepare an emergency plan does not mean this is advisable or appropriate for the nature and vulnerability of development and Laois/Offaly County Councils will not accept an emergency response plan as part of a residential development in isolation or in lieu of appropriate mitigation measures to reduce flood risk to an acceptable standard.

6.8.6 Nature based solutions / Green Infrastructure / SUDS

Measures can be taken that aim to retain water on the landscape during periods of high rainfall and flood by mimicking the functioning of a natural landscape, thereby reducing the magnitude of flood events and providing complementary ecosystem services. In general, nature-based measures aim to:

- Reduce the rate of runoff during periods of high rainfall;
- Provide flood storage in upper catchment areas; and
- Use natural materials and “soft” engineering techniques to manage flooding in place of “hard” engineering in river corridors.

Nature-based measures to control flooding typically focus on the use of porous surfaces in developments (Sustainable Urban Drainage Systems or SuDS), planting of native vegetation communities/assemblages that are tolerant of both wet and dry conditions, and reversing the impacts of over-engineered river corridors (river restoration) to reduce the peak of flood events by mimicking the function of a natural catchment landscape. In addition to providing flood relief benefits, nature-based solutions can provide an array of ecosystem services including silt and pollution control for runoff entering the river system, improved riparian and in-river habitats, localised temperature reduction during periods of extreme heat, reduced maintenance requirements in engineered systems, groundwater recharge, and carbon sequestration.

These measures can be implemented across an array of scales, for instance across a catchment as part of a wider flood relief scheme, or on a site-specific basis as part of a landscaping or green infrastructure plan. Nature-based solutions can provide flood mitigation benefits and ecosystem services across all scales if given adequate planning, and should be considered during the site layout and design stages of a development. The Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Best Practice Interim Guidance Document (2022) provides guidance in making appropriate planning and design decisions to incorporate nature based solutions and climate change adaptation to urban spatial planning.

The drainage design shall ensure no increase in flood risk to the site, or the downstream catchment. Reference should be made to the JLAP objectives.

6.9 'Green Corridor'

It is recommended that, where possible, and particularly where there is greenfield land adjacent to the river, a 'green corridor', is retained on all rivers and streams. This will have a number of benefits, including:

- Retention of all, or some, of the natural floodplain;
- Potential opportunities for amenity, including riverside walks and public open spaces;
- Maintenance of the connectivity between the river and its floodplain, encouraging the development of a full range of habitats;
- Natural attenuation of flows will help ensure no increase in flood risk downstream;
- Allows access to the river for maintenance works;
- Provides benefit to the ecological functioning of the river system;
- Retention of clearly demarcated areas where development is not appropriate on flood risk grounds, and in accordance with the Planning System and Flood Risk Management.
- The width of this corridor should be determined by the available land and topographical constraints, such as raised land and flood defences.

6.10 Bridges, culverts and weirs

Where a planning application includes proposals to amend an existing bridge, culvert or weir, or introduce a new in-channel structure, it will be necessary for the applicant to seek OPW's approval under Section 47 (weirs) and Section 50 (bridges and culverts) of the Arterial Drainage Act 1945. It should be noted that OPW approval under Section 47 and / or 50 does not influence or determine the outcome of the Planning Application process.

7 Settlement Zoning Review

The purpose of land use zoning objectives is to indicate to property owners and members of the public the types of development the Planning Authority considers most appropriate in each land use category. Zoning is designed to reduce conflicting uses within areas, to protect resources and, in association with phasing, to ensure that land suitable for development is used to the best advantage of the community as a whole.

This section of the SFRA will:

- Outline the strategic approach to flood risk management.
- Consider the land use zoning objectives utilised within Portarlinton and assess their potential vulnerability to flooding.
- Based on the associated vulnerability of the particular use, a clarification on the requirement of the application of the Justification Test is provided.
- The consideration of the specific land use zoning objectives and flood risk will be presented for the settlements. Comment will be provided on the use of the sequential approach and Justification Test. Conclusions will be drawn on how flood risk is proposed to be managed in the settlement.
- The Justification Test can only be passed in respect to lands within or adjacent to the town centre. As such the sequential approach must apply to all other new development. This is outlined under Sections 7.3 to 7.7.

7.1 A Strategic Approach to Flood Risk Management

A strategic approach to the management of flood risk is important in Portarlinton, as the risks are varied, with scales of risk and vulnerability varying across the settlement.

Following the Planning Guidelines, development should always be located in areas of lowest flood risk first, and only when it has been established that there are no suitable alternative options should development (of the lowest vulnerability) proceed. Consideration may then be given to factors which moderate risks, such as defences, and finally consideration of suitable flood risk mitigation and site management measures is necessary.

It is important to note that whilst it may be technically feasible to mitigate or manage flood risk at site level, strategically it may not be a sustainable approach.

A summary of flood risks associated with each of the zoning objectives has been provided in the following settlement reviews. The Flood Risk commentary indicates whether a certain land zoning, in Flood Zone A or B, will need to have the Plan Making Justification Test (JT) applied and passed.

When carrying out a site-specific FRA, or when planning applications are being considered, it is important to remember that not all uses will be appropriate on flood risk grounds, hence the need to work through the Justification Test for Development Management on a site by site basis and with reference to Table 7-1. For example, a Town Centre zoning objective can include for an integrated mix of residential, commercial, community and social uses which have varying vulnerabilities and would not be equally permissible within Flood Zone A and B. An overview of the settlement, land use zoning and Flood Zones is presented in Figure 7-1.

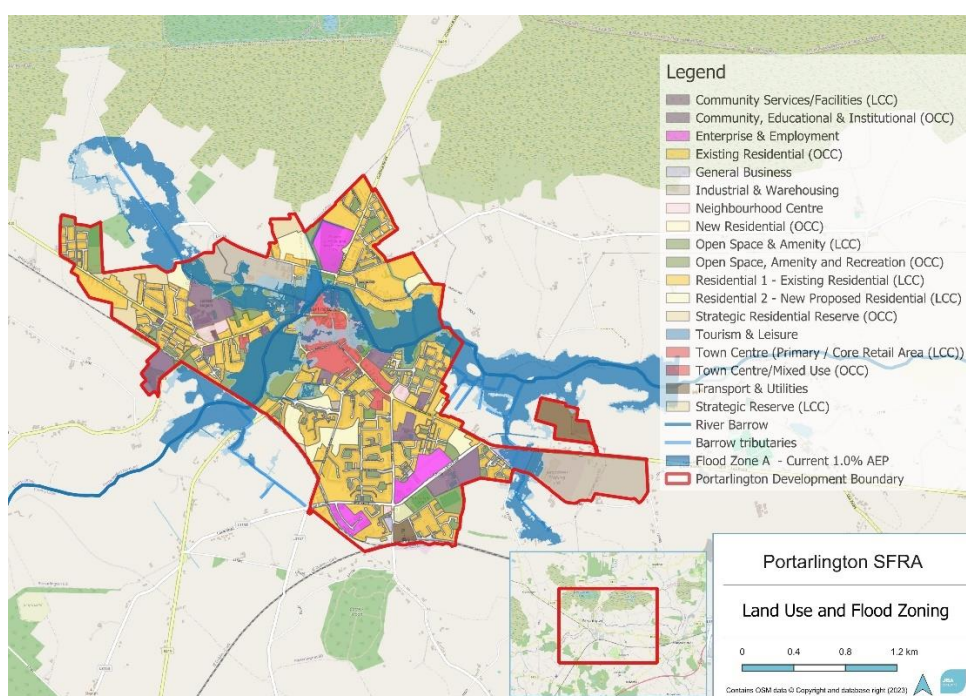


Figure 7-1: Overview of Settlement, Land Use Zoning and Current Flood Zones in Portarlinton

7.2 Amenity & Sustainable Transport Routes

A review of amenity and sustainable transport routes detailed in the Local Area Plan has also been carried out as part of this SFRA. Under the Planning Guidelines and Flood Risk Management, such routes can be classed as water compatible whilst local transport infrastructure and essential infrastructure, such as primary transport routes would be classed as less vulnerable and highly vulnerable, respectively.

Many of the pedestrian and cycle routes proposed in Portarlinton are within Flood Zone A/B (see Figure 7-2) and most are existing. As far as the Justification Test applies, there are no alternative routes which are wholly within Flood Zone C and the Test is not applied in this case. Any new walking and cycling routes should not seek to raise ground levels within the Flood Zone (other than if the route is part of the Flood Relief Scheme – such as an embankment pedestrian/cycling route).

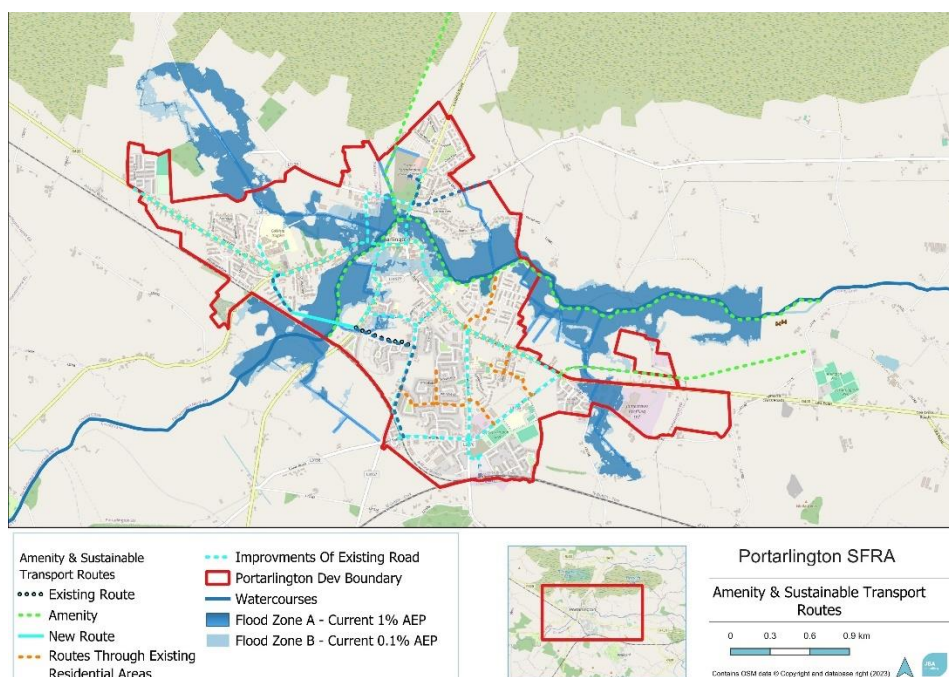


Figure 7-2: Portarlington Active Travel Routes

7.2.1 Sustainable Transport and Bridge Proposal

In July 2023, Portarlington Business Association Sustainability Energy Community ('PBA SEC') submitted Portarlington Greenway Proposal to both Laois and Offaly County Councils. This unsolicited proposal does not form part of the statutory consultation related to the making of the Portarlington Joint Local Area Plan 2025-2031. The proposal relates to the construction of a 'Greenway' walking and cycling route (including an active travel bridge) across the Barrow to connect the Laois and Offaly sides of the town via an active travel route. This route would traverse approximately 500 metres across a green-field site; – Upgrades of Riverside estate on the Offaly side for safe cycling/walking (c. 300m); – Upgrades to roads/crossings on the Offaly side from Riverside estate to Coláiste Íosagáin Secondary School (c. 325m)⁸.

The bridge proposal is located within Flood Zones A and B, also climate change has a high impact covering the majority of the new route and the improvements of an existing route through the Riverside area. The area consists of open space, amenity and recreation lands either side of the Barrow with adjacent existing residential on the Offaly side and existing and proposed residential on the Laois side. The transport objective of a bridge proposal and a walkway will link these two areas providing a social and economic connection between the Laois and Offaly sides of the town converging on the Riverside and Castlelea View areas.

The general approach would be that the Justification test does not apply and for the development of the road and any bridge to be in accordance with a specific FRA that demonstrates that the site can manage flood risk appropriately and without increasing risk elsewhere. It will also be necessary for the applicant to seek OPW's approval under Section 50 (bridges and culverts consent) of the Arterial Drainage Act 1945, to do this a flood risk assessment must be submitted.

⁸ Kilgallen and Partners (2024) *Portarlington Local Area Transport Plan 2024-2030: Laois County Council and Offaly County Council*. Kilkenny.

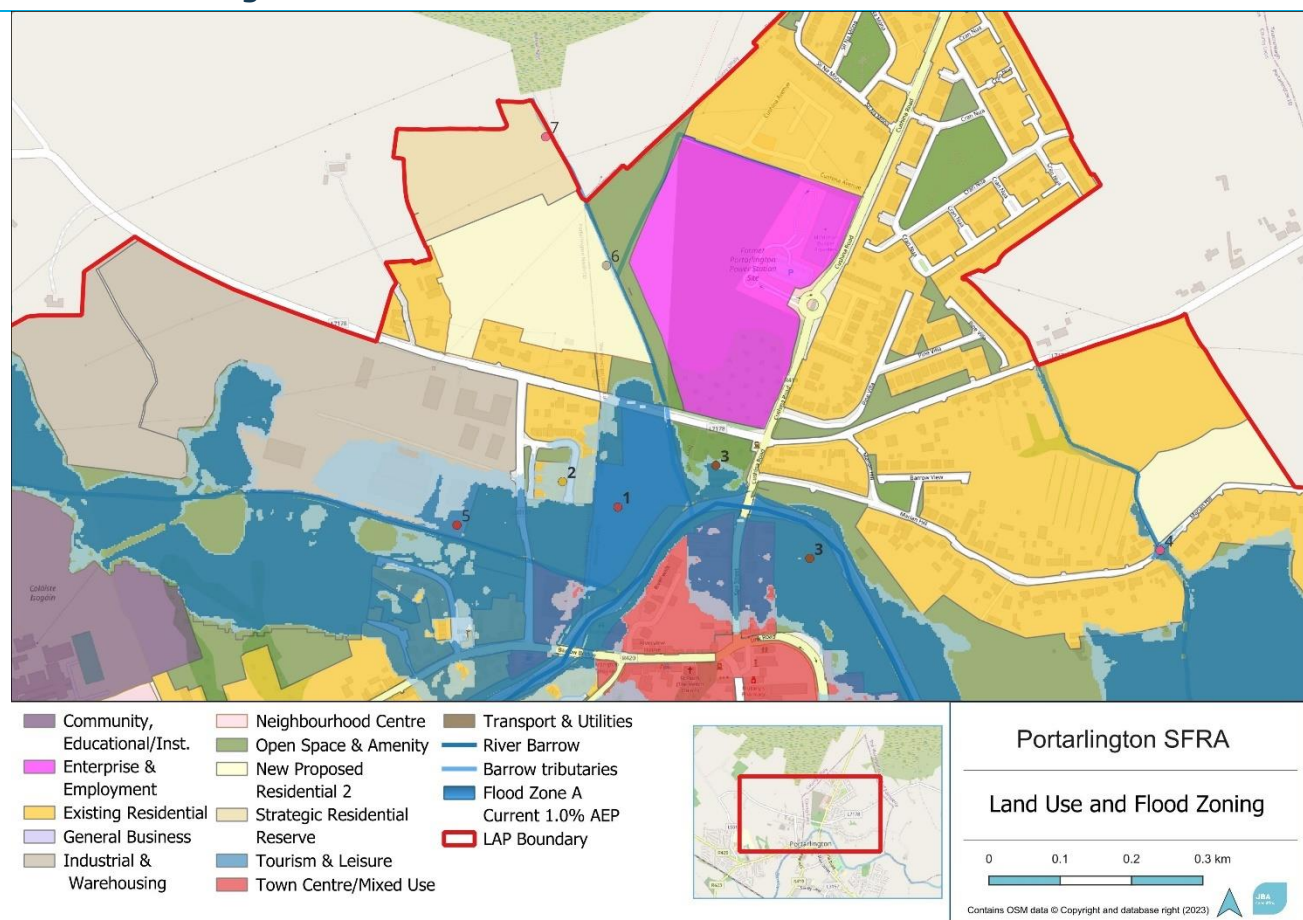
Table 7-1: Zoning Objective Vulnerability

Zoning Objective	Indicative Primary Vulnerability	Flood Risk Commentary
Enterprise & Employment	Less / highly vulnerable	New development not permitted in Flood Zone A or B. JT required for existing development in Flood Zone A
General Business	Less / highly vulnerable	New development not permitted in Flood Zone A or B. JT required for existing development in Flood Zone A
Community, Educational Institutional & (Community Services and Facilities)	Less / highly vulnerable	New development not permitted in Flood Zone A or B. JT required for existing development in Flood Zone A
Existing Residential	Highly Vulnerable	New development not permitted in Flood Zone A or B. JT required for existing development in Flood Zone A and B. Minor developments do not require JT as they come under Section 5.28.
New Proposed Residential	Highly Vulnerable	New development not permitted in Flood Zone A or B.
Open Space and Amenity	Water compatible / less vulnerable	For Water Compatible, JT not required. Less vulnerable development in Flood Zone A not permitted. JT required for existing less vulnerable development in Flood Zone A
Tourism and Leisure	Water compatible, Less / highly vulnerable	For Water Compatible, JT not required. Less vulnerable development in Flood Zone A not permitted. Highly vulnerable in A/B not permitted. JT required for existing less vulnerable development in Flood Zone A or highly vulnerable development in A/B
Neighbourhood Centre	Less / highly vulnerable	New development not permitted in Flood Zone A or B. JT required for existing development in Flood Zone A
Transport & Utilities	Less / highly vulnerable	New development not permitted in Flood Zone A or B. Development is limited to Minor Developments or water compatible and requires JT.
Industrial & Warehousing	Less vulnerable	Appropriate use in Flood Zone B, but JT will be needed in Flood Zone A.
Town Centre/ Town Centre (Primary Core/Retail Area)	Less / Highly Vulnerable	New development in Flood Zone A or B deemed premature pending completion of the FRS. Development is limited to Minor Developments or water compatible and requires JT. Refer to flow charts in Figure 6-1 and Figure 6-2.
Strategic Residential reserve (Strategic Reserve)	Highly Vulnerable	New development not permitted in Flood Zone A or B.

The following sections review the land use zoning objectives for each settlement area within the plan and provide a comprehensive summary of flood risk and justification where necessary.

The flood mapping has been produced in accordance with the Planning Guidelines and therefore ignores the impact of flood protection structures. Areas protected by flood defences still carry a residual risk of flooding due to overtopping or breach, there may also be no guarantee of maintenance in perpetuity.

7.3 Portarlinton North



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Flood Zone Data	Flood Relief Scheme
Historic Flooding	Recurring fluvial flooding impacting roads and properties.
Comment	The location of this area is in lands north of a bend in the River Barrow where the confluence of the Blackstick Drain and another tributary of the Barrow, at the northern end of the town centre. FRS mapping shows Existing Residential, Open Space and Amenity, Tourism and Leisure within Flood Zones A and B.
Climate Change	Moderate to high sensitivity to climate change
Conclusion	<p>Flood risk areas are numbered on the map and annotated below. There is flood risk to Existing Residential (2), Open Space and Amenity (3), Tourism and Leisure (1) and Industrial & Warehousing (5), New Residential (6), Strategic Residential Reserve (7).</p> <p>Open space and amenity (3) is water compatible and appropriate uses within Flood Zones A and B. Guidance from Section 6.3.4 applies for this type of development and an appropriately detailed SSFRA would be required if there is any change to topography or any buildings are included.</p> <p>Tourism and Leisure land adjacent to Botley Lane (1), comprises of undeveloped land located in Flood Zone A, the Justification Test cannot pass or be applied for lands that are not within or adjacent to the core Town Centre; as such the following conditions apply;</p>

- Development should be managed in accordance with the sequential approach whereby only water compatible use is appropriate within Flood Zone A.
- Guidance from Section 6.3.4 applies and an appropriately detailed SSFRA would be required. There should be no loss of floodplain or interruption to conveyance routes.

The proposed Flood embankments will protect existing residential at Botley Court and at Rosecourt Lawns (2). In advance of the FRS risk to these existing residential lands can be managed by following the sequential approach and avoiding highly vulnerable development in Flood Zone A or B and according to the recommendations contained in Section 6 and on the basis that development is;

- Limited to extensions, renovations and change of use.
- Bedrooms should be located in the upstairs of two-story buildings when extending existing property.
- Demolition/reconstruction consisting of infill residential development can only take place in Flood Zone C.
- An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA.

A culvert upsize crossing beneath Marion Hill Road (4), this is part of the FRS and will ease pressure on the culvert, benefiting houses in proximity to the tributary.

The Justification Test cannot pass or be applied for lands that are not within or adjacent to the core Town Centre. Therefore risk to Industrial and Warehousing lands (5) can be managed by following the sequential approach and avoiding less vulnerable development in Flood Zone A and according to the recommendations contained in section 6 and on the basis that development is;

- Limited to extensions, renovations and change of use within Flood Zone A.
- The sequential approach should be applied and highly vulnerable elements of the site should be preferentially located in Flood Zone C, or raised/bunded/protected;
- An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA.

New Residential (6) zoning extends up to the small watercourse flowing along the eastern boundary of the site, the lands are principally in Flood Zone C but there is a boundary with the watercourse to the east. In this case development will be managed by the following:

- Guidance from Section 6.3.4 applies and an appropriately detailed SSFRA would be required for the wider development land ensuring mitigation in accordance with Section 6.8. There can be no loss of floodplain or interruption to conveyance routes.
- It will be necessary to include a riparian buffer adjacent to the channel (open space setback) from the top of bank for a minimum distance of 10m.

New Strategic Residential Reserve lands (7) cannot be developed within the lifetime of the plan but do include a watercourse on the eastern boundary of the site. It would be necessary to include a riparian buffer (open space setback) from the top of bank for a minimum distance of 10m in any future

development plan to safeguard the watercourse and potential floodplain, which should also be defined in more detail in the next JLAP.

Any development shall also be required to be built in accordance with the JLAP SuDS Policy.

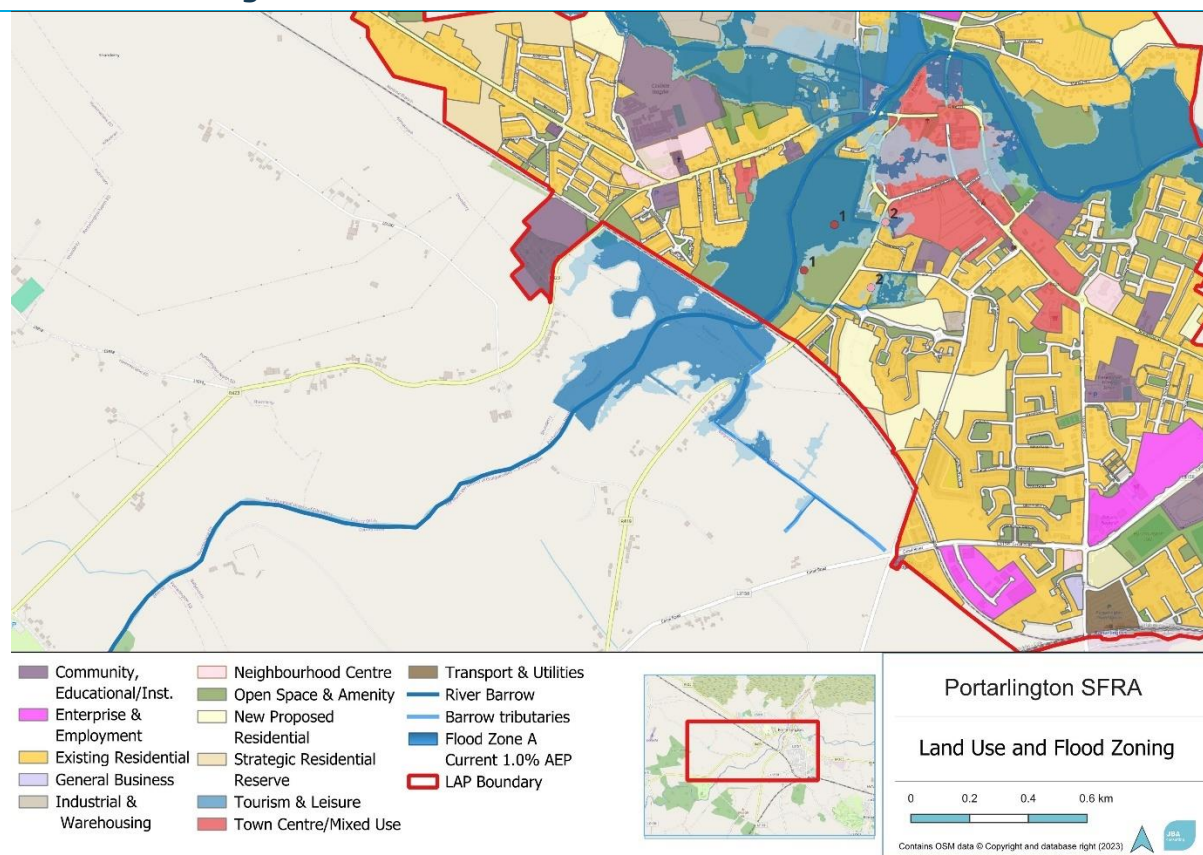
The following zoned lands are undeveloped, there is a significant opportunity to include nature based solutions and SuDS for the management of stormwater as outlined in Section 6.8.6 and Surface Water Policy summarised in Section 5.2.

- Lands zoned as Existing Residential off R419 (Edenderry Road) and adjacent to Enterprise and Employment.
- Enterprise and Employment off R419 (Edenderry Road) and to the rear of current developed land.
- Proposed Residential off L7178 and also off Droughill Road.

FRM measures should be safeguarded by zoning or objectives in the written statement.

Elsewhere in the area, risk can be managed in line with approved Policy and the guidance provided within Section 6 of this SFRA.

7.4 Portarlington South West

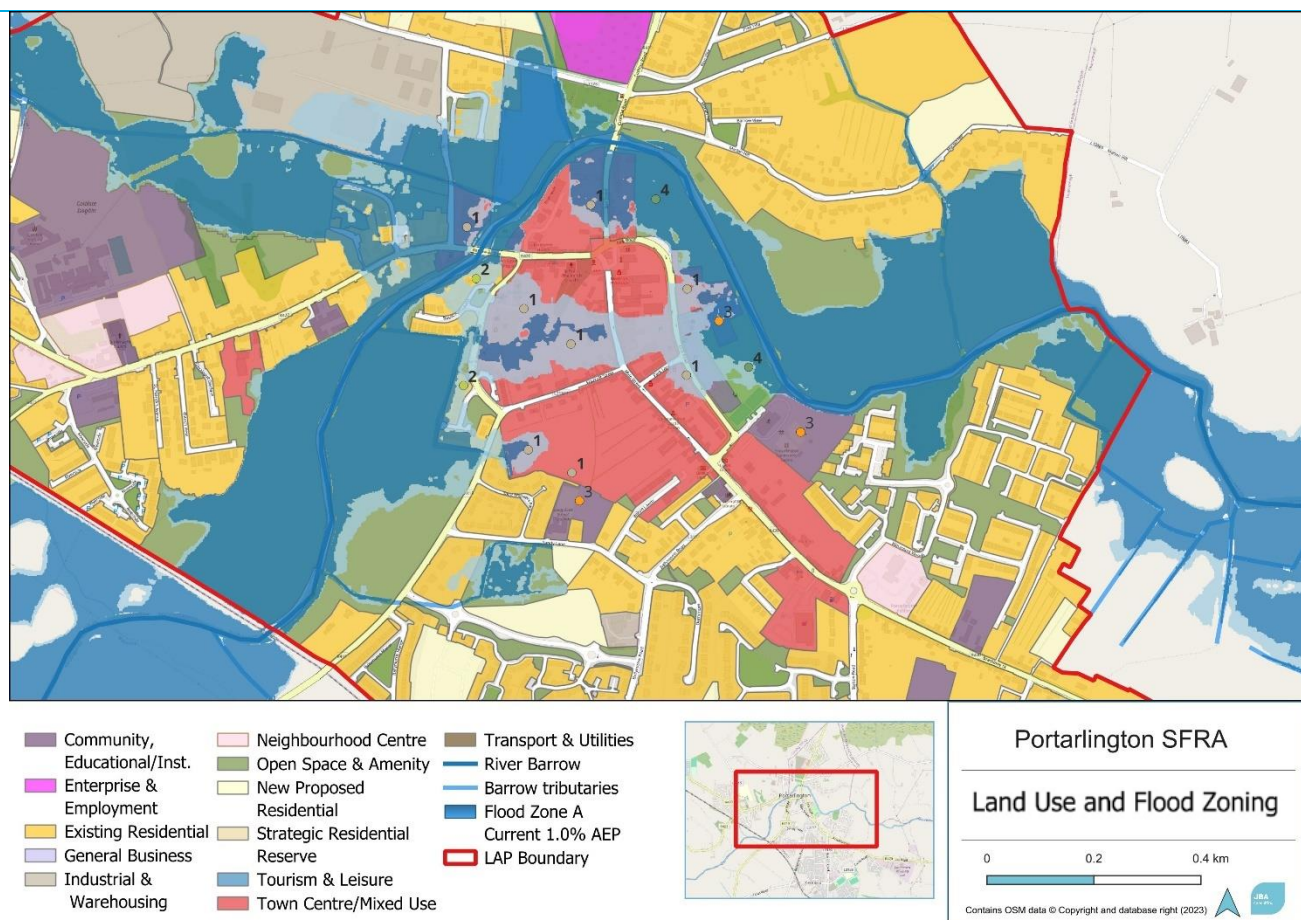


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Flood Zone Data	Flood Relief Scheme
Historic Flooding	Recurring combined fluvial flooding impacting roads and properties.
Comment	The Barrow flows south west to north east towards the town centre, three tributaries/ drains have a confluence with the river in the area. There is flood risk to lands within flood zones A and B. FRS mapping shows existing residential, town centre, open space and amenity lands are in Flood Zone A and B.
Climate Change	High sensitivity to climate change
Conclusion	<p>Flood risk areas are numbered on the map and annotated below.</p> <p>Open space and amenity lands (1) are water compatible and is an appropriate use within Flood Zones A and B. Guidance from Section 6.3.4 applies for this type of development and an appropriately detailed SSFRA would be required if there is any change to topography or any buildings are included.</p> <p>The majority of the land is undeveloped open space apart from existing residential along Main Street (R420) and, other areas along R419 including Foxcroft and St. Michaels Park.</p> <p>The Justification Test cannot pass or be applied for lands that are not within or adjacent to the core Town Centre. Therefore, risk to existing residential lands (2) can be managed by following the sequential approach and avoiding less or highly vulnerable development in Flood Zone A or B and that development is;</p>

	<ul style="list-style-type: none"> • Limited to extensions, renovations and change of use. • Bedrooms should be located in the upstairs of two-story buildings when extending existing property. • Demolition/reconstruction consisting of infill residential development can only take place in Flood Zone C. • An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA. <p>Proposed flood defence walls will benefit existing residential Rose Court located to the west of the town centre. Defences continue as an embankment, protecting Foxcroft Avenue and Court and town centre lands to the rear.</p> <p>The following zoned lands are undeveloped, there is a significant opportunity to include nature based solutions and SuDS for the management of stormwater as outlined in Section 6.8.6 and Surface Water Policy summarised in Section 5.2.</p> <ul style="list-style-type: none"> • Lands zoned as Existing Residential off Canal Road and adjacent to the Railway line. • Proposed Residential Castlelea View southern area and adjacent to Ballymorris Manor. • Proposed Residential Castlelea View northern area and to the south of Sandy Lane. Community Services / Facilities off Sandy Lane. <p>FRM measures should be safeguarded by zoning or objectives in written statement.</p> <p>Elsewhere in the area, risk can be managed in line with approved Policy and the guidance provided within Section 6 of this SFRA.</p>
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7.5 Town Centre

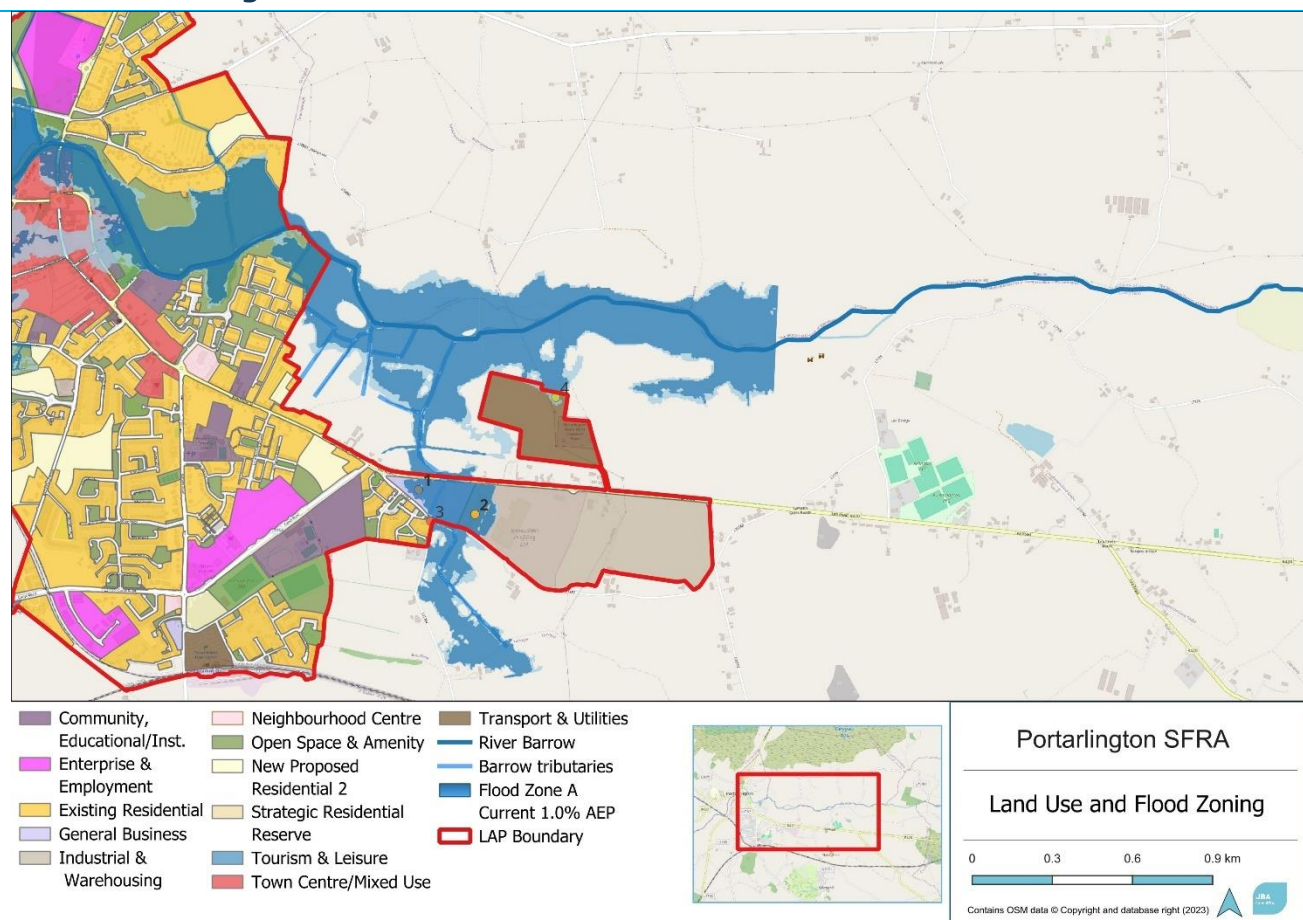


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Flood Zone Data	Flood Relief Scheme
Historic Flooding	Recurring fluvial flooding impacting roads and properties.
Comment	The location is on a bend in the River Barrow where the confluence of the Blackstick Drain and an unnamed tributary of the Barrow are located. Flood risk to Town Centre/Retail Core, Existing Residential, Community Educational & Institutional, Open space and Amenity within Flood Zones A and B.
Climate Change	High sensitivity to climate change.
Conclusion	<p>Flood risk areas are numbered on the map and annotated below. For any highly vulnerable development under Town Centre zoning (1) in Flood Zone A/B the following guidance applies;</p> <ul style="list-style-type: none"> There can be no further infill or redevelopment/new highly vulnerable development within Flood Zone A/B until the Portarlinton FRS is fully operational, any such development would be premature. This non-structural flood risk management measure is a response to the current level of risk present in Portarlinton and the inability to effectively manage it on a structural level until the FRS is complete. <p>The approach for any new/infill less vulnerable development under Town Centre zoning within Flood Zone A/B reflects that the risk is lower and that development can proceed on the basis that:</p> <ul style="list-style-type: none"> Any future development should be subject to an FRA which

	<p>should follow the general guidance provided in Section 6 of the SFRA.</p> <ul style="list-style-type: none"> Development must specifically address points under the Justification Test as listed in Appendix A.1. <p>Risk to existing Town Centre lands (1) can be managed by ensuring that development in Flood Zone A or B;</p> <ul style="list-style-type: none"> Is limited to extensions, renovations and change of use for highly vulnerable uses; Less vulnerable use is less restrictive and in line with the guidance above, new/infill and extensions/renovations/change of use are possible, but must be subject to an appropriately detailed SSFRA. <p>The Justification Test for existing residential zoning (2) is passed on the basis that the points detailed in Part 3 of the JT under Appendix A.2 are adhered to, key points include that:</p> <ul style="list-style-type: none"> Prior to completion of the FRS no new/infill residential is appropriate within Flood Zone A/B; Any development is limited to extensions, renovations and change of use. Bedrooms should be located in the upstairs of two-story buildings when extending existing property. An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA. <p>The Justification Test for Community Educational & Institutional zoning (3) is passed on the basis that the points detailed in Part 3 of the JT under Appendix A.3 are adhered to, key points include:</p> <ul style="list-style-type: none"> For any highly vulnerable use, prior to completion of the FRS no new/infill is allowable within Flood Zone A/B; Prior to completion of the FRS within Flood Zone A/B development should be water compatible or less vulnerable. Any future development should be subject to an FRA which should follow the general guidance provided in Section 6 of the SFRA. <p>Open space and amenity lands (4) are water compatible and is an appropriate use within Flood Zones A and B. Guidance from Section 6.3.4 applies for this type of development and an appropriately detailed SSFRA would be required if there is any change to topography or any buildings are included.</p> <p>The following zoned lands are undeveloped, there is a significant opportunity to include nature based solutions and SuDS for the management of stormwater as outlined in Section 6.8.6 and Surface Water Policy summarised in Section 5.2.</p> <ul style="list-style-type: none"> Undeveloped Town Centre zoned land to the north of Foxcroft Street. Undeveloped Town Centre zoned land to the south of Foxcroft Street and to the rear of current housing. <p>FRM measures proposed under the Portarlinton FRS should be safeguarded by zoning or objectives in written statement.</p> <p>Elsewhere in the area, risk can be managed in line with approved Policy and the guidance provided within Section 5 of this SFRA.</p>
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7.6 Portarlinton East



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Flood Zone Data	Flood Relief scheme
Historic Flooding	Recurring fluvial flooding impacting roads and properties.
Comment	River Barrow flows from east to west at the northern section with several tributaries/drains. There is flood risk to lands within Flood Zones A and B. FRS mapping shows industrial and warehousing, existing residential on the northern section, enterprise and employment and transport & utilities in Flood Zones A and B.
Climate Change	Moderate sensitivity to climate change
Conclusion	<p>Flood risk areas are numbered on the map and annotated below. Risk to general business (1), Industrial and Warehousing (2), Existing Residential lands, (3), Transport and Utilities (4), .</p> <p>General business (1) is not within or adjacent to the core Town Centre and the Justification Test cannot pass. Risk can be managed by following the sequential approach and avoiding less vulnerable development in Flood Zone A and according to the recommendations contained in Section 6 and on the basis that development is;</p> <ul style="list-style-type: none"> Limited to extensions, renovations and change of use within Flood Zone A. The sequential approach should be applied and highly vulnerable elements of the site should be preferentially located in Flood Zone C, or raised/bunded/protected in Flood Zone B;

	<ul style="list-style-type: none"> • An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA. • Any development shall also be required to be built in accordance with the JLAP SuDS Policy. <p>Industrial and Warehousing lands (2) is not within or adjacent to the core Town Centre and the Justification Test cannot pass. Risk can be managed by following the sequential approach and avoiding less vulnerable development in Flood Zone A and according to the recommendations contained in section 6 and on the basis that development is;</p> <ul style="list-style-type: none"> • Limited to extensions, renovations and change of use within Flood Zone A. • The sequential approach should be applied and highly vulnerable elements of the site should be preferentially located in Flood Zone C, or raised/bunded/protected; • An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA. <p>Any development shall also be required to be built in accordance with the JLAP SuDS Policy.</p> <p>Existing residential lands (3) are not within or adjacent to the core Town Centre and the Justification Test cannot pass. Risk can be managed by following the sequential approach and avoiding less or highly vulnerable development in Flood Zone A or B and according to the recommendations contained in Section 6 and on the basis that development is;</p> <ul style="list-style-type: none"> • Limited to extensions, renovations and change of use. • Bedrooms should be located in the upstairs of two-story buildings when extending existing property. • Demolition/reconstruction consisting of infill residential development can only take place in Flood Zone C. <p>An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA.</p> <p>Risk to Transport and Utilities zoning (4) is predominantly restricted to undeveloped land and adjacent to the new battery storage facility (5) which was granted planning in 2023 and is currently under construction. The battery storage facility is only impacted by Flood Zone B for a small area on the northern boundary. Risk should generally be managed by following the sequential approach and avoiding highly vulnerable development in Flood Zone A/B and less vulnerable development in Flood Zone A and according to the recommendations contained in section 6 and on the basis that;</p> <ul style="list-style-type: none"> • The sequential approach should be applied and highly vulnerable elements of any new development should be preferentially located in Flood Zone C, or raised/bunded/protected. • For any new planning applications in this zoning type an appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA. • Any development shall also be required to be built in accordance with the JLAP SuDS Policy.
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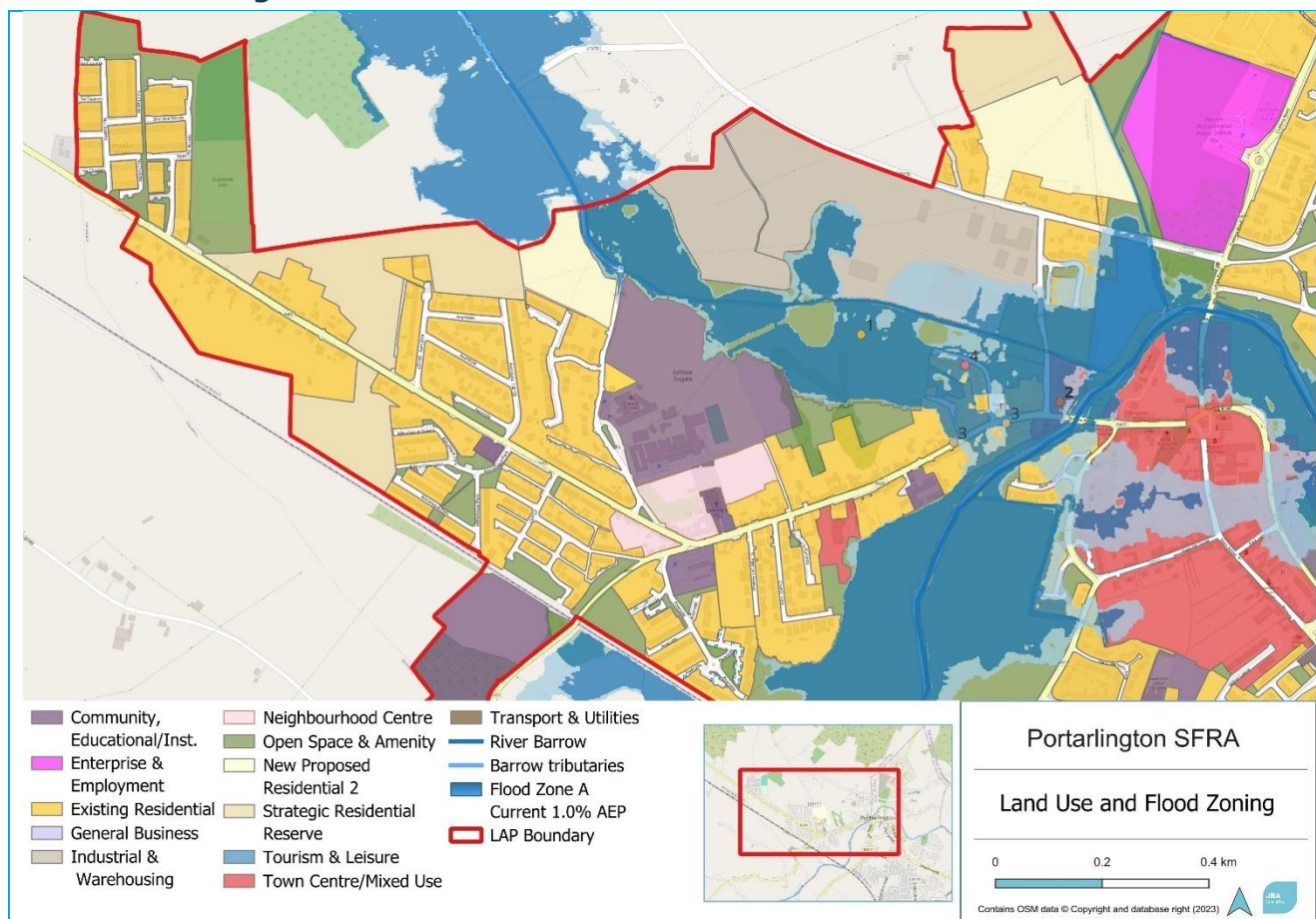
The following zoned lands are undeveloped, there is a significant opportunity to include nature based solutions and SuDS for the management of stormwater as outlined in Section 6.8.6 and Surface Water Policy summarised in Section 5.2.

- Proposed Residential at the junction of Station Road and Railway Mews.
- Community Educational and Institutional to the rear and north of Presentation primary School, Station Road.
- Community Educational and Institutional to the rear of Portarlinton Further Education and Training Centre, Bracklone Street.
- Community Educational and Institutional adjacent to St. Patricks Boys National School, Canal Road.
- Enterprise and Employment off Canal Road.

Elsewhere in the area, risk can be managed in line with approved Policy and the guidance provided within Section 6 of this SFRA.

FRM measures proposed under the Portarlinton FRS should be safeguarded by zoning or objectives in written statement.

7.7 Portarlinton West



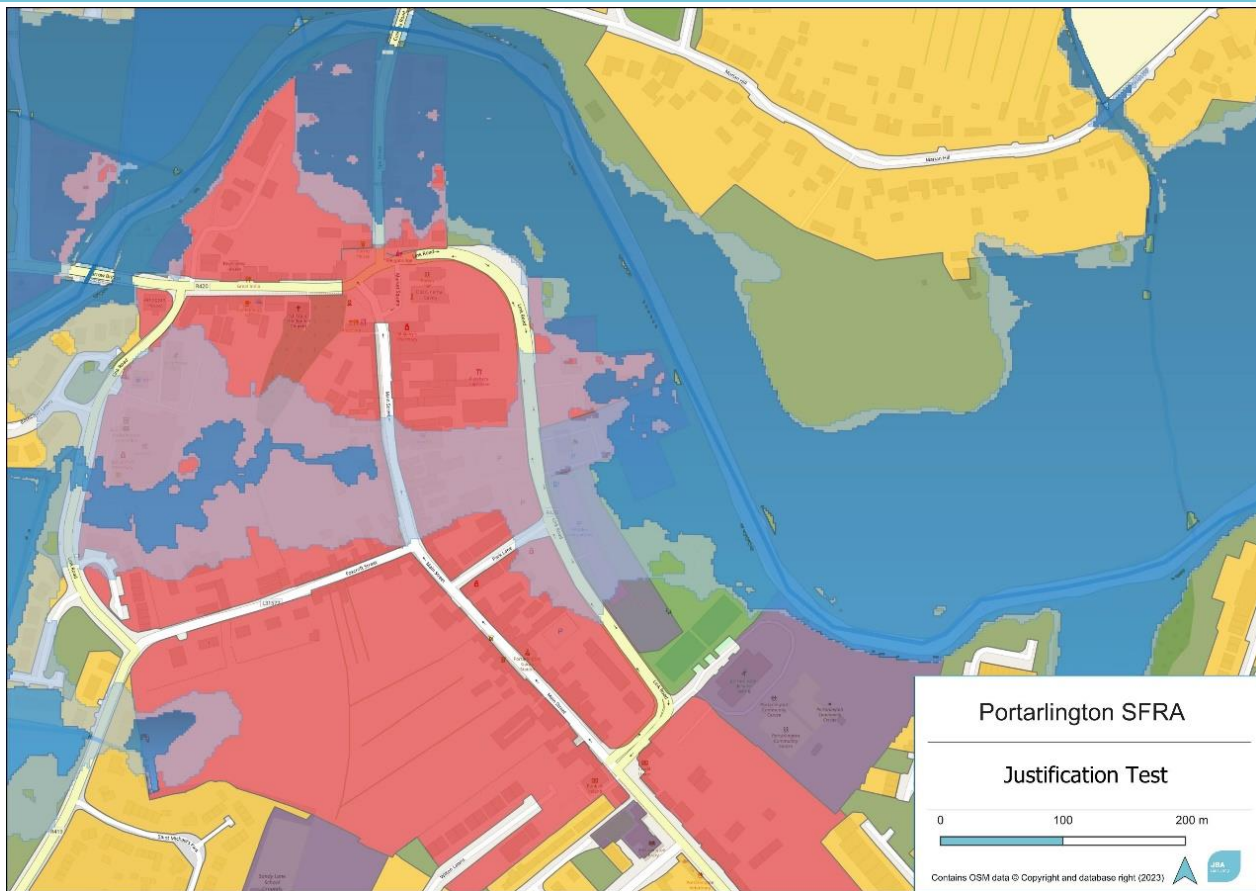
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Flood Zone Data	Flood Relief scheme
Historic Flooding	Recurring fluvial flooding impacting roads and properties.
Comment	The Blackstick Drain traverses this settlement area flowing south east towards the River barrow. There is flood risk to lands within Flood Zones A and B. FRS mapping shows mixed use, existing residential, industry, business and employment, public, community and education, open space and amenity, partially in Flood Zone A and B from fluvial flooding.
Climate Change	Moderate sensitivity to climate change.
Conclusion	<p>Flood risk areas are numbered on the map and annotated below. Open Space and Amenity lands (1) are water compatible and appropriate uses within Flood Zones A and B. Guidance from Section 6.3.4 applies for this type of development and an appropriately detailed SSFRA would be required if there is any change to topography or any buildings are included.</p> <p>Open Space and Amenity (1), Town Centre (2), adjacent existing residential (3) at Patrick Street lands are primarily within Flood Zone A and B. The approach to Town Centre lands is discussed in Section 7.5.</p> <p>In Advance of the FRS Risk to existing residential lands (3) can be managed by following the sequential approach and avoiding highly vulnerable development in Flood Zone A or B and according to the recommendations contained in Section 6.3 and on the basis that;</p> <ul style="list-style-type: none"> Existing development within Flood Zone A/B development is limited to extensions, renovations and change of use.

	<ul style="list-style-type: none"> • There should be no new or infill development within Flood Zone A/B. • An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA. • Any development shall also be required to be built in accordance with the SuDS Policy. <p>The Proposed flood wall and embankment on the LHB will protect Town Centre (2) and Existing Residential lands (3) off Patrick Street from the River Barrow. The Proposed flood wall and embankment on the RHB will protect these same areas, Town Centre (2) and Existing Residential lands (3) at Patrick Street from the Blackstick Drain to the north.</p> <p>In advance of the FRS, risk to existing residential lands (3) can be managed by following the sequential approach since the area is not within or adjacent to the core Town Centre and the Justification Test cannot pass. The sequential approach will avoid less or highly vulnerable development in Flood Zone A or B and apply the recommendations contained in Section 6 and on the basis that development is;</p> <ul style="list-style-type: none"> • Limited to extensions, renovations and change of use. • Bedrooms should be located in the upstairs of two-story buildings when extending existing property. • Demolition/reconstruction consisting of infill residential development on the ground floor can only take place in Flood Zone C. • An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA. <p>The proposed Flood embankments will protect existing residential Abhann Dubh (4) and properties along Patrick Street/R420 areas (3). The public, community and educational area consisting of Coláiste Íosagáin will also have some marginal benefit.</p> <p>The following zoned lands are undeveloped, there is a significant opportunity to include nature based solutions and SuDS for the management of stormwater as outlined in Section 6.8.6 and Surface Water Policy summarised in Section 5.2.</p> <ul style="list-style-type: none"> • Community Services and Facilities adjacent to St. Michaels Cemetery off the R423. • Community Services and Facilities to the rear of Coláiste Íosagáin and Oakdale Nursing Home off Bog Road. • Proposed Residential, off the Bog Road. • Town centre (Primary Core Retail Area) south of Patrick street and adjacent to Kilmalogue Gardens. <p>FRM measures should be safeguarded by zoning or objectives in written statement.</p> <p>Elsewhere in the area, risk can be managed in line with approved Policy and the guidance provided within Section 6 of this SFRA.</p>
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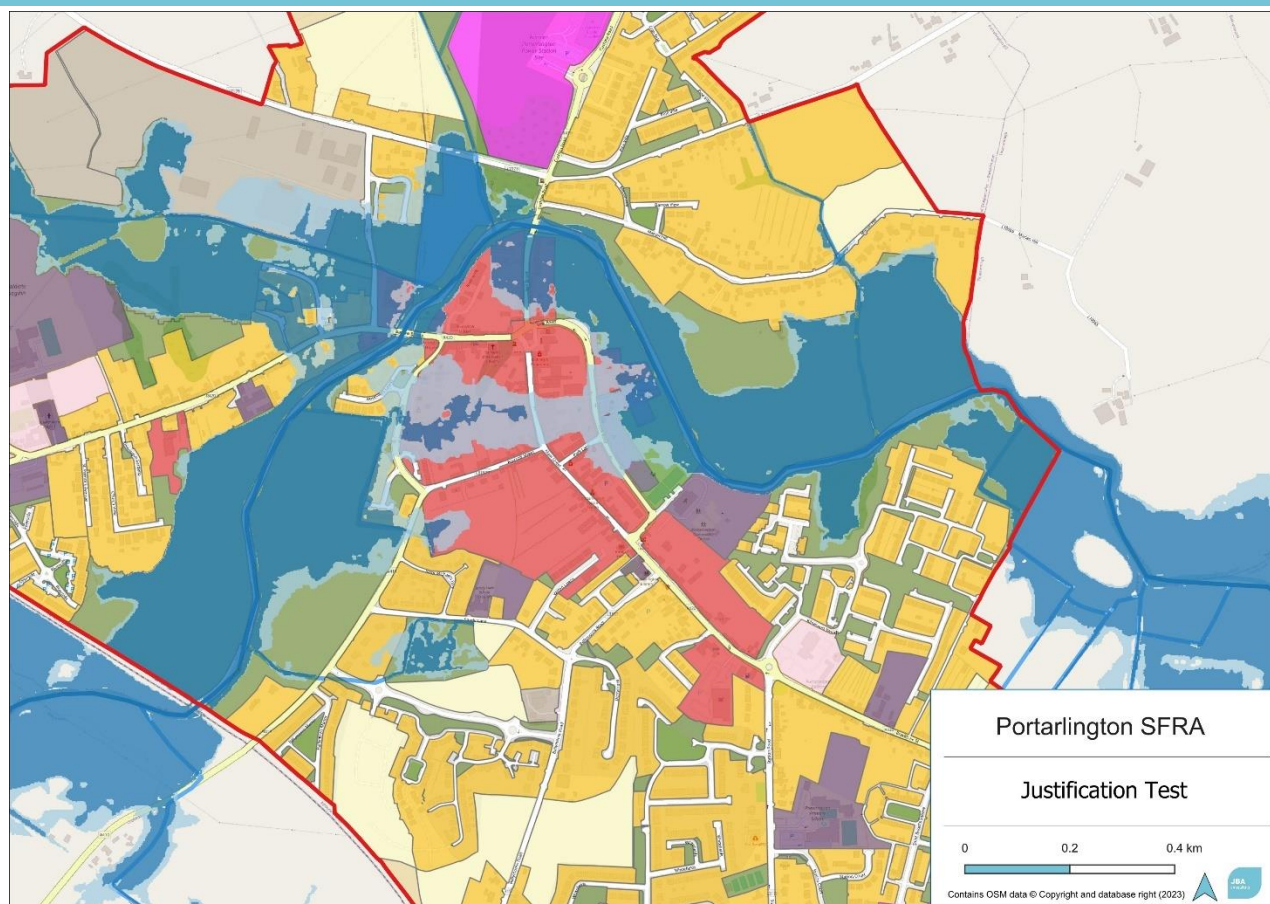
A Appendix A – Justification Tests

A.1 Portarlinton Town Centre Zoning

	
<p>1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.</p>	<p>Yes.</p> <p>Portarlinton is identified as a Self-sustaining Growth Town within the Laois County Development Plan 2021-2027. It is identified as a Self-sustaining Town within the Offaly County Development Plan 2021-2027.</p> <p>It is targeted for growth under a whole suite of plans; national, regional, county and local.</p>
<p>2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:</p>	<p>Yes.</p>
<p>i. Is essential to facilitate regeneration</p>	<p>Yes.</p>

and/or expansion of the centre of the urban settlement:	
ii. Comprises significant previously developed and/or under-utilised lands:	Yes.
iii. Is within or adjoining the core of an established or designated urban settlement:	Yes.
iv. Will be essential in achieving compact and sustainable urban growth;	Yes.
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Yes.
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>Significant parts of the Town Centre zoning are within Flood Zone A/B. A Flood Relief Scheme is in development but does not currently protect the town. Recommendations take this into account and seek to limit highly vulnerable development within Flood Zone A/B until such a time as the scheme is constructed.</p> <p>Parts 1 & 2 of the test found that it is considered appropriate to retain the zoning. This is on the basis that;</p> <ul style="list-style-type: none"> • Highly vulnerable use is restricted to extensions/renovations and change of use within Flood Zone A/B until the FRS is complete. • Less vulnerable development within Flood Zone A/B is appropriate prior to the delivery of the FRS but must be subject to an FRA which should follow the general guidance provided in Section 6 of the SFRA. • Infill highly vulnerable development and demolition and reconstruction can only take place in Flood Zone C. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 6 of the SFRA and must also be required to be built in accordance with the appropriate SuDS Policy.

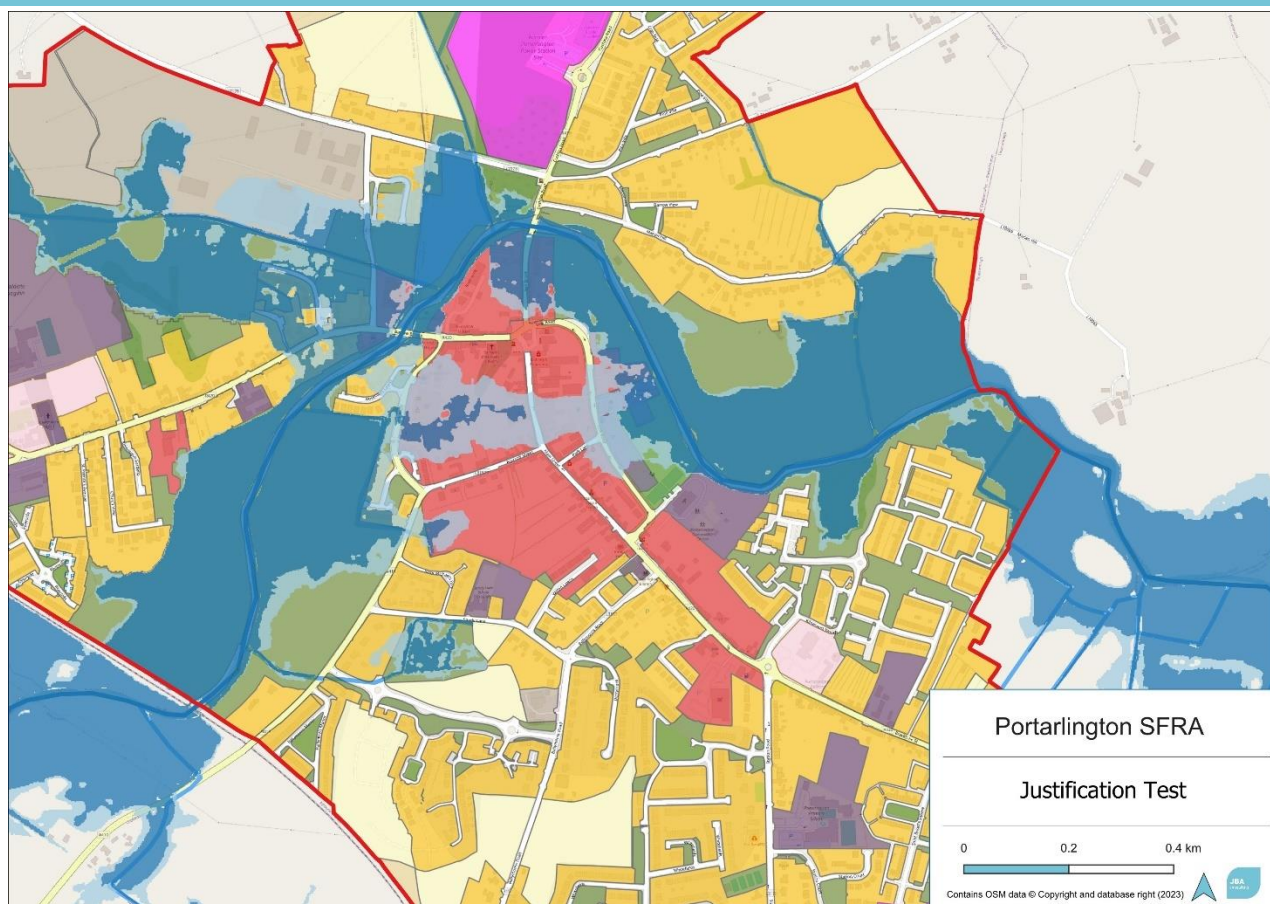
A.2 Existing Residential – Adjacent to Town Centre



1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.	<p>Yes.</p> <p>Portarlinton is identified as a Self-sustaining Growth Town within the Laois County Development Plan 2021-2027. It is identified as a Self-sustaining Town within the Offaly County Development Plan 2021-2027.</p> <p>It is targeted for growth under a whole suite of plans; national, regional, county and local.</p>
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:	Yes.
i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement:	Yes.
ii. Comprises significant previously developed and/or under-utilised lands:	Yes.

iii. Is within or adjoining the core of an established or designated urban settlement:	Yes.
iv. Will be essential in achieving compact and sustainable urban growth;	Yes.
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Yes.
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>A significant proportion of the existing residential lands here are within Flood Zone A and B.</p> <p>Parts 1 and 2 of the test found that it is considered appropriate to retain the existing zoning. This is on the basis that;</p> <ul style="list-style-type: none"> • Prior to completion of the FRS no new/infill residential is appropriate within Flood Zone A/B; • Any development is limited to extensions, renovations and change of use. • Bedrooms should be located in the upstairs of two-story buildings when extending existing property. • An appropriately detailed FRA will be required which should follow the general guidance provided in Section 6 of the SFRA.

A.3 Community Educational & Institutional – Adjacent to Town Centre



1. The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, as amended.	<p>Yes.</p> <p>Portarlinton is identified as a Self-sustaining Growth Town within the Laois County Development Plan 2021-2027. It is identified as a Self-sustaining Town within the Offaly County Development Plan 2021-2027.</p> <p>It is targeted for growth under a whole suite of plans; national, regional, county and local.</p>
2. The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular:	Yes.
i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement:	Yes.
ii. Comprises significant previously developed and/or under-utilised lands:	Yes.

iii. Is within or adjoining the core of an established or designated urban settlement:	Yes.
iv. Will be essential in achieving compact and sustainable urban growth;	Yes.
v. There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Yes.
3. A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere. N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment	<p>Some Community Educational and Institutional is within the current Flood Zone A/B. This principally affects the lands adjacent to and including the fire station, car park and Laois County Council yard. A marginal area of Sandy Lane School is impacted by Flood Zone B and a small margin of the leisure centre land is also impacted.</p> <ul style="list-style-type: none"> • For any highly vulnerable use, prior to completion of the FRS no new/infill is allowable within Flood Zone A/B; • Prior to completion of the FRS within Flood Zone A/B development should be water compatible or less vulnerable. • Any future development should be subject to an FRA which should follow the general guidance provided in Section 6 of the SFRA.

B Appendix B - Historic Flooding

B.1 2008

In August 2008 during the review of the historical data indicated that flooding occurred in Portarlinton after a heavy and prolonged period of rainfall. In Portarlinton, flooding occurred at a Laois County Council yard, the swimming pool and on roads and properties around Spa Bridge and Barrow Bridge. A peak river level of 65.2mOD (Malin) and corresponding peak flow of 81.6m³ /s for the River Barrow were recorded at Portarlinton Hydrometric Station as per the OPW hydrometric website "www.opw.ie/hydro". This was the 4th highest level on record at this station see Figure 4-2.

Flooding also occurred in Portarlinton in the following previous years; January 2005, January 2004, January 2000, January 1995, February 1990, February 1974, December 1968, December 1954⁹.

B.2 2005

In the Portarlinton area, information found on www.floodmaps.ie indicate that flooding occurred at an Industrial Estate in Buttle Lane, Bog Lane and Mill Island with no additional information provided. The event occurred on the 8th January 2005. No detail on the flood event was given and so the lowest return period (10% AEP) has been used for comparison. The 10% AEP model results show flooding occurring at Buttle Lane, with a maximum depth of between 0.6m and 0.9m Figure 4-3 and Bog Lane, with a maximum depth of between 0.3m and 0.6m see Figure 4-4. Figure 4-5 shows the Mill Island Flooding of the same year.

B.3 2004

During the historical review, photographs were found on www.floodmaps.ie showing the extent of the flooding which occurred at Mill Island and in the vicinity of Barrow Bridge in Portarlinton on 16th January 2004. No details on the full extent of damage caused were available. No detail on the flood event was given and so the lowest return period (10% AEP) has been used for comparison, the model results show a maximum depth of water between 1.5m to 1.8m Figure 4-6.

B.4 Up to the year 2000

The following floods happened up to the year 2000, information was sourced from South Eastern CFRAM HA14 Hydrology report.

In the Portarlinton area, photographs found on www.floodmaps.ie indicate that flooding occurred at an Industrial Estate in Buttle Lane. However no additional information was provided. The event occurred on the 12th January 2000. No detail on the flood event was given and so the lowest return period (10% AEP) has been used for comparison.

The historical data available on www.floodmaps.ie indicates that flooding occurred in Portarlinton, starting on 28th January 1995 when heavy rain caused the River Barrow to break its banks. Further details of this flooding were obtained from photos, Carlow

⁹ The Office of Public Works (2018) *Flood Risk Management plan Barrow* p.26. Available at: https://s3-eu-west1.amazonaws.com/docs.floodinfo.opw/floodinfo_docs/Final_FRMPs_For_Publication/FRMP_Final2018_RiverBasin_14.pdf [Accessed 07 May 2024].

County Council documentation/memos, OPW notes and photos and from press articles in the Irish Times, Irish Independent, Kilkenny People and Nationalist & Leinster Times South Eastern CFRAM Study HA14 Hydraulics Report - FINAL IBE0601Rp0017 4.11.32 F04 (published in late January and early February of 1995). The River Barrow had a peak level of 65.23 mOD (Malin) at Portarlinton Hydrometric Station according to the OPW hydrometric website (<http://www.opw.ie/hydro>). The corresponding peak flow of 81.8m³/s was calculated using an extrapolated rating curve (all flows above 40m³/s). A rating review has been carried out for this gauging station. The resulting updated rating curve gives a reliable rating up to around 100m³/s. A peak river level of 65.23 m AOD gives a corresponding peak flow of 53.7m³/s. The modelled peak flow at the gauging station, during the 10% AEP event was 72.66m³/s. This suggests the January 1995 event was less than a 10% AEP event.

Information was found on www.floodmaps.ie for a flood event that occurred in Portlaoise, in February 1990 when heavy rain caused the Barrow and the Triogue to break their banks. Further details of the flood were obtained from press articles published in the Evening Press (Cork), Irish Independent, Irish Times and the Nationalist & Leinster Times in the beginning and middle of February. The River Barrow flooded in Portarlinton as a result of heavy and prolonged rainfall. The Convent and CBS schools were closed on advice of the local authority and dozens of households were flooded. Water supply was also cut as the Council decided against drawing water supplies from the Barrow. Both Patrick and Spa Streets were flooded and two premises on Lower Main Street required pumping by the fire brigade. The vicinity of the railway station was also flooded. The OPW hydrometric website (<http://www.opw.ie/hydro>) states the maximum flow rate for the River Barrow was estimated to be 124m³/s at Portarlinton Hydrometric Station during this event (the flow was estimated due to a recorder malfunction). This peak flow of 124m³/s was calculated using an extrapolated rating curve (all flows above 40m³/s) and the recorded peak water level of 65.7m AOD. Both Patrick and Spa Street are shown to flood during the modelled 10%, up to 0.6m at both streets, and 1% AEP event, up to 0.9m at both streets (Figures 4.11.30 and South Eastern CFRAM Study HA14 Hydraulics Report - FINAL IBE0601Rp0017 4.11.33 F04 4.11.31). Flooding of up to 0.9m is shown at the rear of houses along Main St during the 1% AEP event, see Figure 4.11.38.

Around late January and early February, the OPW Hydrometric website outlined the peak flow of 45m³/s and corresponding peak level of 64.86mOD (Malin) for the River Barrow at Portarlinton Hydrometric Station to be similar to other annual maximum values around that time. A peak river level of 64.86m AOD gives a corresponding peak flow of 39.88m³/s. The modelled peak flow at the gauging station, during the 10% AEP event was 72.66m³/s. This suggests the February 1974 event was much lower than the 10% AEP event. No further information is available for this event.

Information was found in Irish Independent and Irish Times press articles for a flood event which occurred in Portarlinton 24th and 25th December 1968. Heavy rain caused the River Barrow to break its banks. In Portarlinton flooding forced 20 families to spend Christmas in the upper stories of their houses on Spa Street. A peak level of 65.48mOD (Malin) and a corresponding peak flow of 80.4m³/s were recorded at Portarlinton Hydrometric Station for the River Barrow as shown on the OPW hydrometric website (<http://www.opw.ie/hydro>). This peak flow of 80.4m³/s was calculated using an extrapolated rating curve (all flows above 40m³/s) and the recorded peak water level.

A flood event was found to have occurred in Portarlinton, South Eastern CFRAM Study HA14 Hydraulics Report - FINAL IBE0601Rp0017 4.11.34 F04 on 8th December 1954. Details on the event were obtained from press reports in the Evening Press (Dublin), the Irish Independent and the Irish Times and from maps available on www.floodmaps.ie. In Portarlinton the River Barrow burst its banks flooding hundreds of acres of land in the area. Flood water and stormy conditions caused a wall of a

cottage to collapse. No information was available on flows, levels, exact extents or return periods. Large areas of land are shown to flood during all modelled events¹⁰.

¹⁰ RPS (2016) *South Eastern CFRAM Study, HA-14 Hydraulics Report, p466-473*. Belfast: Office of the Public Works. Available from: [Southeastcfra.ie/wp-content/uploads/2011/08/Barrow-Hydraulics-Report---HA14.pdf](https://southeastcfra.ie/wp-content/uploads/2011/08/Barrow-Hydraulics-Report---HA14.pdf) [Accessed 07 May 2024].

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